- 1955 pulp and paper highlights
- Production, engineering, process trends
- New products
- New equipment, materials, performance
- 1955 industrial expansion

The Paper Industry

Publishers of PAPER AND PULP MILL CATALOGUE

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nalco®

A chemical service organization . . . guiding industry toward more efficient use of water.

NATIONAL ALUMINATE CORPORATION
6222 West 66th Place • Chicago 38, Illinois

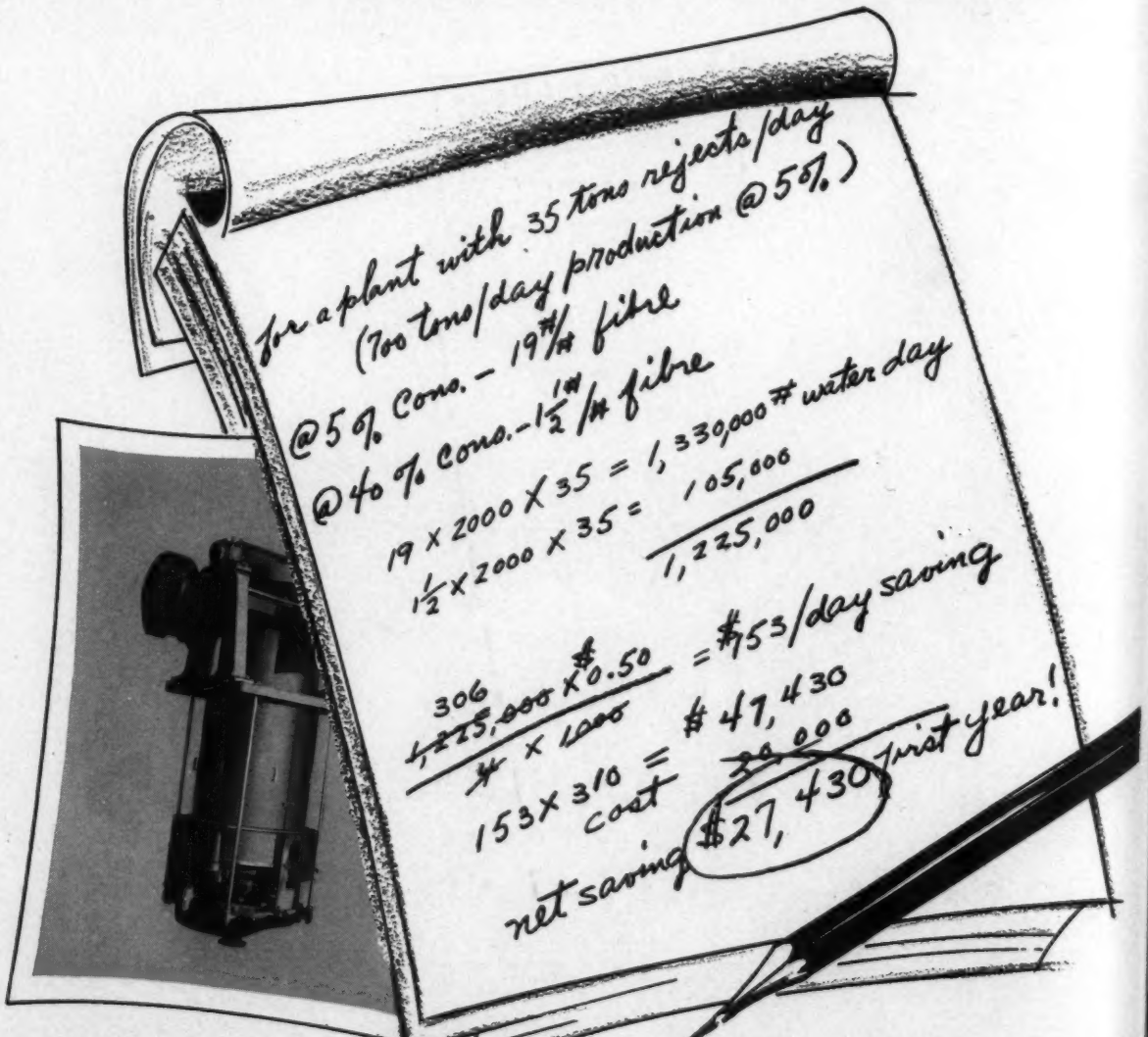
Our 37th Year September 1955

EVAPORATORS OVERLOADED?

SHORT OF STEAM?

Rejects put back into the system at low consistency can be the cause of the trouble!

Many plants are now solving this problem simply and efficiently by using a Jackson & Church High Density System. Here is what this can mean to you in dollars-and-cents savings . . .


for a plant with 35 tons rejects/day
(700 tons/day production @ 5%)
@ 5% Cons. – 19#/# fibre
@ 40% Cons. – 1½#/# fibre
19 × 2000 × 35 = 1,330,000 # water day
1½ × 2000 × 35 = 105,000
1,225,000
306
1,225,000 × $0.50 / # × 1000 = $153/day saving
153 × 310 = $47,430
cost 20,000
net saving $27,430 first year!

J-C Zenith* Continuous Pulp Press

* Trademark

Using the Jackson & Church High Density System, great savings can be effected in the handling of rejects! Write for further information on how J-C can help you save!

J-C

JACKSON & CHURCH CO. SAGINAW, MICHIGAN

Work well done since eighty-one

TEST PROVE
for yourself

With size press or calender stack application of Kelsize or Kelgin, you surface-treat your paper and board to secure the precise surface characteristics you require. You get just-right surfaces for brilliant mottle-free high gloss, velvety semi-gloss, or clean, sharp flat fine-line and halftone printing.

You use far less ink, yet produce brighter, clearer printing with improved uniformity, color yield and appearance. Ink films bond quickly and completely to the sheet, controlling costly and messy rub off or offsetting. You effect substantial ink savings.

Versatile Kelco hydrophilic colloids provide uniformly dense and smooth printing surfaces, uniform ink acceptance, and a better surface for coating, waxing, and varnishing.

Test prove for yourself high gloss, semi-gloss, or flat printing produced by use of these versatile Kelco hydrophilic colloids: Kelsize, Kelsize S, Kelgin, Kelgin LV, Kelgin XL. For full information about the measurable advantages you derive with the Kelgins and Kelsizes, write your nearest Kelco regional office.

KELSIZE® / KELSIZE S® / KELGIN®
KELGIN LV® / KELGIN XL®

products of

KELCO COMPANY

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improve printability with **KELSIZE** *or* **KELGIN**

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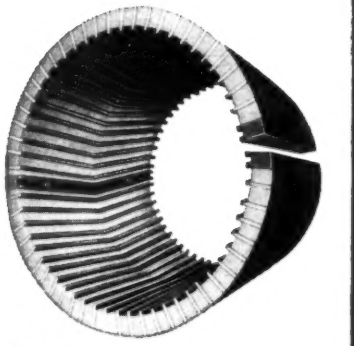
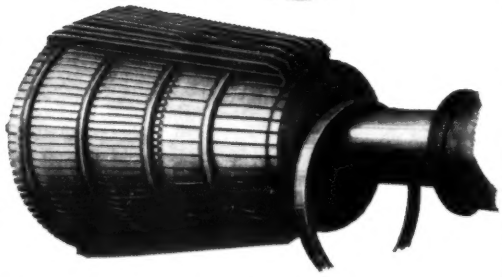
SUPER DURABLE
PLUG AND SHELL FILLING
by Shartle





Forty years of mill experience and shop engineering have produced the most durable plug and shell fillings the mills have ever known.

SHARTLE BULLDOG*

Best woods – kiln or air-dried – straight-grained white oak, maple, hickory, beech, bethabara, also laminated plastics. Fluted for several chippings.

Bar – special Flint 32* heat treated, stainless steel, phosphor bronze or Monel.

Assembled in jigs with adjustable wedge to assure snug fit. Every bar and wood keyed with heavy bands and babbitt reinforced. Anchor bars optional.

SHARTLE X66 PLUG

Full metal to metal support over entire length of plug bar, provides over twice the support obtainable in other plugs.

Bars beaded and woods grooved, making it impossible for bars to tip or woods to rise. Provides for high impact resistance.

Extra bar width provides more useable bar life – a feature found only in X66* plug fillings.

Both plug and shell fillings available to fit any make, type, or size jordan. Day or night emergency service guaranteed.

THE BLACK-CLAWSON COMPANY

SHARTLE BROS. MACHINE DIVISION • MIDDLETOWN, OHIO

*Trademark

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 37 • NUMBER 6 • SEPTEMBER 1955

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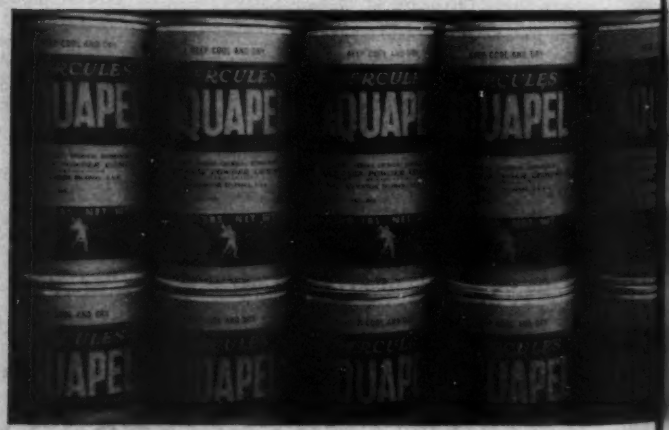
These Drops Tell the Story:

ACID, WATER, OR ALKALI...

THE PHOTOGRAPHS at right were taken under identical conditions — with one exception. In each case, drops of acid, water and alkali were placed simultaneously on the same grade of paper. But one sheet had been conventionally sized, the other Aquapel sized. That was the only difference — but what a difference:

The sheet conventionally sized has already begun to absorb the acid and alkali. Only the water has been repelled. But on the sheet sized with Aquapel, all three — acid, water and alkali — failed to penetrate. It's little wonder, therefore, that paper mills everywhere are investigating the 'Aquapel Difference.". . . .

EASY TO APPLY—Aquapel may be applied with any equipment commonly used for surface treatment of paper, such as size tub, size press, calender box, or coating machine. Aquapel dispersions can also be applied by spray equipment such as shown here. We would be glad to tell you the advantages of this new method.



100-POUND DRUMS—Aquapel is available in convenient, easy-to-handle fiber drums containing 100 pounds net.

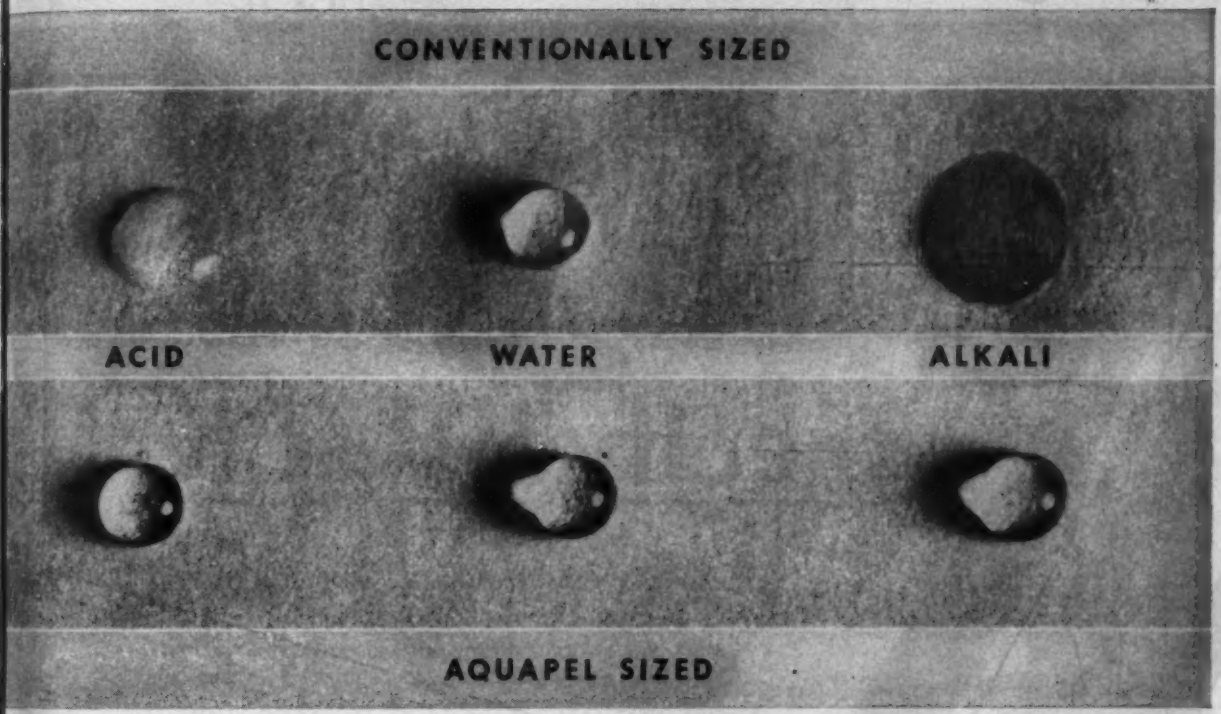
Paper Makers Chemical Department

HERCULES POWDER COMPANY

INCORPORATED

961 King St., Wilmington 99, Del.

IT'S ALL THE SAME TO AQUAPEL®



. . . . Aquapel is a different kind of sizing agent. It's not a resin, not a wax. Aquapel is an alkylketene dimer, a chemical compound that reacts with cellulose fibers to form a surface that is resistant to the penetration of cold water, hot water, acid, or alkali.

Aquapel is different because it becomes an integral part of the material treated. It is not held on solely by adhesion or other physical means.

Aquapel is different because while usually applied on the surface, it is not a surface size in the usual sense. It replaces rather than supplements beater sizing with rosin size and alum.

And Aquapel is economical to use—a little goes a long way.

Why not find out for yourself what a difference Aquapel can make. Write for technical data and a sample.

Paper Makers Chemical Department

HERCULES POWDER COMPANY

INCORPORATED

961 *King St., Wilmington 99, Del.*

Whether your paper machines call for the largest or smallest . . . finest or coarsest of felts — you can depend on Huyck to meet your needs *exactly* — — —

The reason: Huyck employs the most advanced feltmaking equipment — with the biggest group of large looms in the industry (including the world's largest) — to meet today's and *tomorrow's* requirements for wide felts, or to weave the smaller ones endless.

Huyck leads in the development of new feltmaking techniques and chemical treatments — such as "4-D" — resulting in felts that help to improve production and quality, and reduce costs.

You're bound to see it. Whether you are running the lightest tissue or the heaviest board — *it pays to specify felts trademarked with the blue and red stripes of Huyck.*

Write today for your free copy of the new Huyck Felt Bulletin (Vol. II, No. 8), "Suction Press Operation on a High Speed News Machine."

NEW!

HUYCK FELTS

FIRST IN QUALITY . . . FIRST IN SERVICE

F. C. HUYCK & SONS • Rensselaer, New York
Established 1870

Get sales-winning opacity in your waxed paper wraps with

UNITANE®

TITANIUM DIOXIDE PIGMENTS

The UNITANE pigments build opacity and brilliant whiteness into your waxing stocks, providing a sparkling white background for your customers' sales messages. Furthermore, the UNITANE pigments "lock in" these qualities so they remain, no matter how thoroughly the paper is waxed and moistureproofed.

UNITANE O-110, the water-dispersible anatase type, is brilliantly white, efficient, and easily dispersed to give uniform opacity. As with all UNITANE anatase or rutile pigments, a little goes a long way. Its particle fineness and high refractive index insure opacity that no finishing process can destroy.

Ask your Cyanamid Pigments representative for full information and samples of the UNITANE pigments best suited for your product and mill operations.

AMERICAN Cyanamid COMPANY

PIGMENTS DIVISION

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

BRANCH OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

WHITEN AND BRIGHTEN WITH UNITANE

SAVE-ALL lives up to its name at boardmill

Shown above is a Marx Save-All built by Chicago Bridge & Iron Company for use at an eastern boardmill. The Save-All was installed to recover valuable waste fibers from white water and to alleviate stream pollution. How's it doing? The latest month for which figures are available shows that the Save-All is recovering 97.4% of all fibrous solids that pass through it. Stream pollution is reduced to a like degree.

In addition to the efficient Marx Save-All, we also build elevated water tanks, storage tanks, digesters and other special steel plate structures for every pulp and paper mill need. Write our nearest office for complete information.

CB&I

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
Los Angeles • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • Tulsa • Washington
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

YARWAY DIGESTER BLOW VALVES with AUTOMATIC LUBRICATION

One of a battery of Yarway Digester Blow Valves, motor-operated, with automatic lubricators, in a large Washington pulp mill.

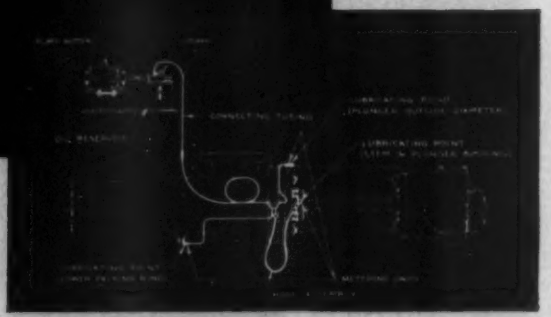


Diagram showing arrangement of Yarway Automatic Lubricator on Yarway Digester Blow Valve.

..help increase production, cut maintenance and save manpower

Automatic lubricators on Yarway Seatless Digester Blow Valves add new cost-saving and labor saving features to digester operation.

Push-button control of these valves also provides automatic lubrication of them at the *right* places . . . at the *right* time. Result—less maintenance, fewer production delays, release of manpower for other productive work.

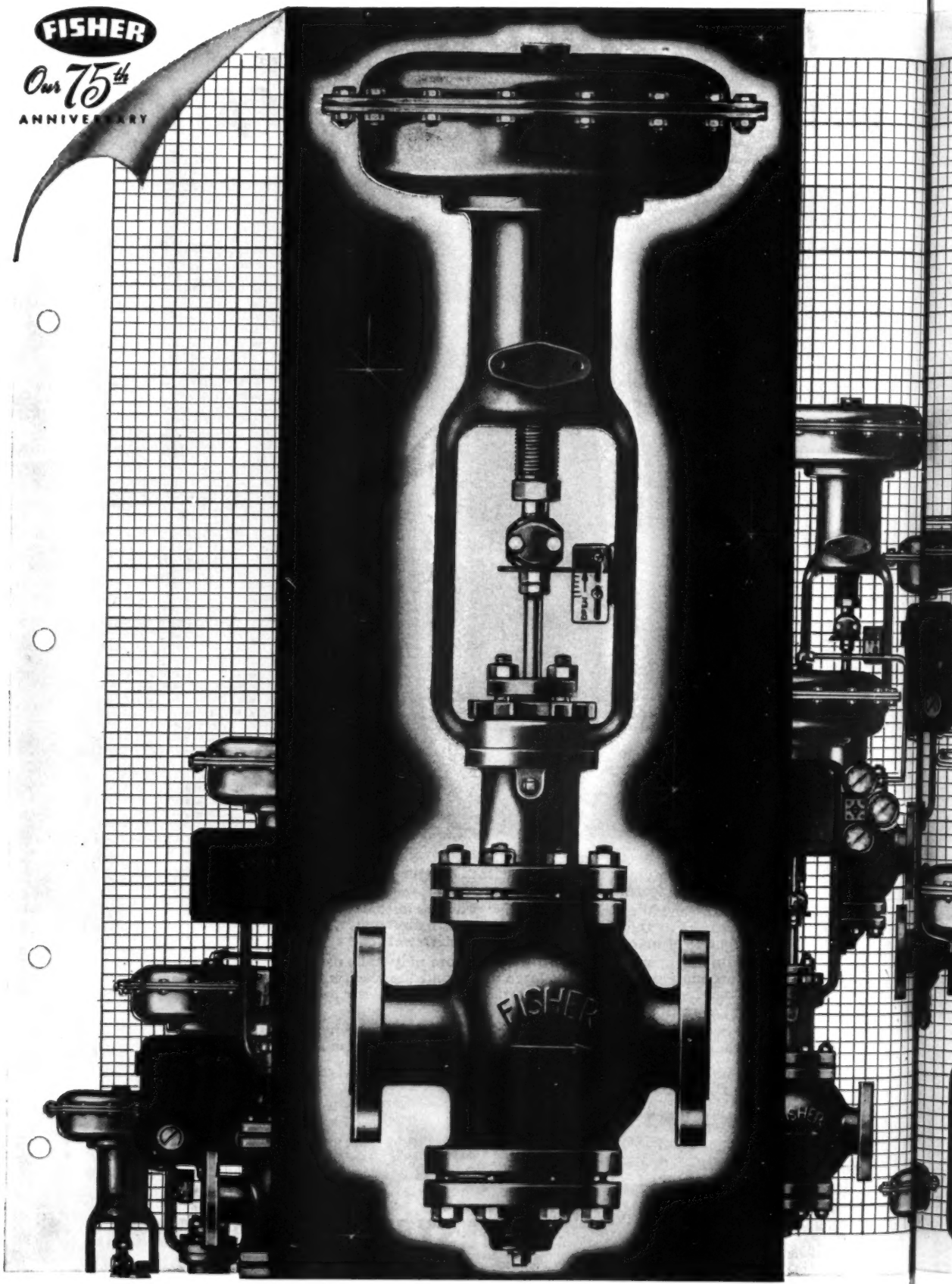
Reports on low operating cost experiences from pulp mills using Yarway Digester Valves, are impressive, too. One large mill found the resultant *savings in operation and maintenance the first year more than paid for the cost of their new 4 Yarway Digester Valves.*

Yarway Seatless Digester Blow Valves are either motor or hydraulically operated. All are remote controlled—designed for clean, free discharge and tight shut-off.

For full information on Yarway Seatless Digester Blow Valves, write for Bulletin B-441. No obligation.

YARNALL-WARING COMPANY
149 Mermaid Ave., Philadelphia 18, Pa.
BRANCH OFFICES IN PRINCIPAL CITIES

DIGESTER BLOW VALVES


FISHER
Our 75th
ANNIVERSARY
FISHER

FISHER®

Presents An Improved

DIAPHRAGM MOTOR VALVE OPERATOR

Bolted-clamp type stem connection. This allows large latitude in valve stroke adjustment. It can be disconnected in the field without damage to the stem. It will not shake loose from vibration or rotational inner valve forces.

• Rugged body to yoke connection with hammer lug nut. • Deep drawn steel diaphragm casings. • Specially designed molded diaphragms. • Bolted gland stuffing box with Teflon packing. • Improved clear view travel indicator. • Spring ranges: 3 to 15 psi; 3 to 27 psi; 6 to 30 psi.

FISHER GOVERNOR COMPANY • Marshalltown, Iowa

WORLD LEADER IN RESEARCH FOR BETTER PRESSURE AND LIQUID LEVEL CONTROL

HAM FELTZ says:

If you are a manufacturer of strictly high quality folding boxes and are operating within fast and economical shipping distance of Ohio, Pennsylvania, Maryland or New England you are doubtless familiar with the trademark of Federal Paper Board Company, Inc., Bogota, New Jersey.

Folks tell me that FEDERAL selects its customers with the same care it uses in selecting the wool felts upon which its various styles of boxboard are formed and finished.....

Hamilton Felts

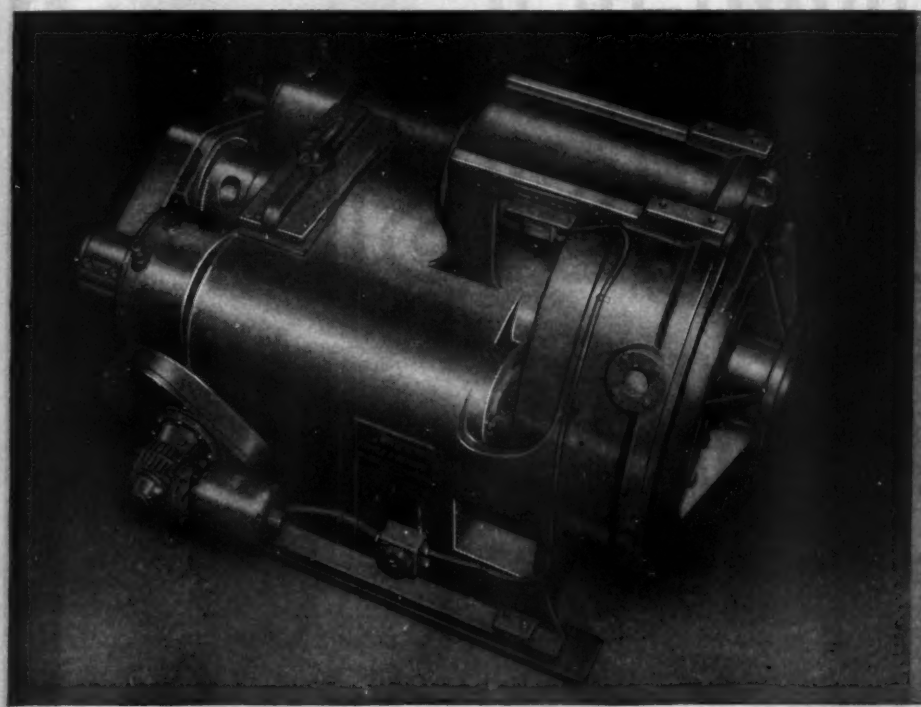
From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lowest cost.

MIAMI WOOLEN MILLS *Established 1858*

SHULER & BENNINGHOFEN, HAMILTON, OHIO

DOUBLE-D WITH EQUA-FLO

DOUBLE EFFECT



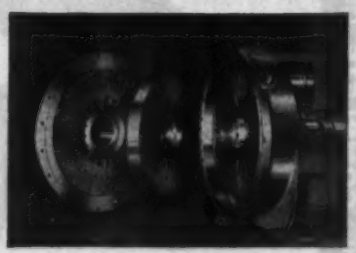
This overhead view illustrates the compactness of the Double-D. Very economical of floor space, it can be located and piped up in much the same manner as a conventional Jordan.

Consistently does the work of two or more conventional refiners . . .

You're looking at the new Jones Double-D Refiner . . first truly pressurized disc refiner — clean-lined, compact, easy to operate, easy to maintain . . . and already setting performance records.

For the Double-D is a *proven* machine. Full-scale production units have been in operation in several mills for as long as 18 months — and in fact several mills have already re-ordered.

They report stock quality equal or better than any other refiners, with substantial savings in time, horsepower and floor-space. Ask your Jones representative for details or write for Bulletin No. EDJ-1083.



This "exploded" photograph shows the heart of the Double-D. Stock passing under constant pressure between two rotating and two stationary discs receives true two-pass refining . . . double effect.

Jones

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

. . . THE COMPLETE QUALITY LINE . . . POWELL VALVES . . . THE COMPLETE QUALITY LINE . . .

. . . THE COMPLETE QUALITY LINE . . . POWELL VALVES . . . THE COMPLETE QUALITY LINE . . .

POWELL VALVES . . . THE COMPLETE QUALITY LINE . . . POWELL VALVES

FIG. 2192—Large Swing Check Valve for 200 Pounds W.O.G.

POWELL NI-RESIST VALVES

FIG. 2193—1-Piece Yoke Gate Valve for 200 Pounds W.O.G.

FIG. 2194—Gate Valve for 225 Pounds W.O.G.

FIG. 2193—2-Piece Yoke Gate Valve for 200 Pounds W.O.G.

Powell Ni-Resist* Valves have far greater corrosion, erosion and heat resistance than ordinary cast iron. Similar to gray iron, and resembling austenitic stainless steel, no other cast metal offers such a unique combination of useful properties.

Ni-Resist Valves are especially adapted for pulp and paper mill liquors, alkalies and sludges, caustic soda, and wherever high nickel iron alloy valves are required.

Consult your Powell Valve distributor. If none is near you, we'll be pleased to tell you about Powell Ni-Resist Valves—send for our *new* literature.

The Wm. Powell Company, Cincinnati 22, Ohio . . . . . 109th year

*Trademark of The International Nickel Co.

New book describes world-wide pulp & paper development services

Here is a book that tells how you can profit by using the comprehensive world-wide services of The Parsons & Whittemore-Lyddon Organization. With more than 100 years of experience, this international organization can facilitate your pulp and paper business development anywhere in the world. "Growing with the Paper Industry" explains these services:

Marketing wood pulp, and *developing new pulp and paper business abroad.*

Testing and research, to determine the suitability of such raw materials as cereal-straw, rice-straw, bagasse, abaca, esparto grass, eucalyptus, bamboo and fast-growing tropical hardwoods, in the making of paper.

Advice about and aid in producing pulp and paper of suitable material anywhere on earth; or redesigning of existing plants; assistance in developing a financial program.

Distributing machinery world-wide for pulp and paper making, as well as for use in the graphic arts.

Providing top management wherever needed for foreign pulp and paper projects.

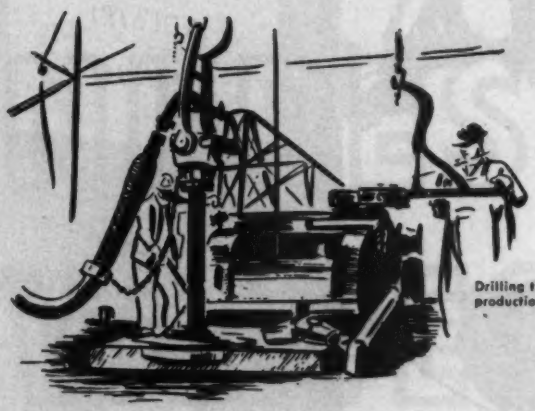
From building production facilities to marketing pulp and paper anywhere in the free world, this Organization can help you. This new book—and its companion volume "The Mechano-Chemical Process for Production of Pulp from Straw, Bagasse and other Vegetable Fibres"—will tell you how.

Write for your free copies of these books.

THE PARSONS & WHITTEMORE / LYDDON ORGANIZATION

World Leaders in the Development of Pulp Mills for the Use of Bagasse, Straw or Other Vegetable Fibres

250 Park Ave., New York 17, N. Y. **35 New Bridge St., London EC4, England**



Drilling the production wells

Crude Sulphur

for Industrial Use

from the properties of

Texas Gulf Sulphur Co.

75 East 45th Street • New York 17, N. Y.

Producing Units

- **NEWGULF, TEXAS**
- **MOSS BLUFF, TEXAS**
- **SPINDLETOP, TEXAS**
- **WORLAND, WYOMING**

Growing in Popularity

Victoria Green WBP

CRYSTALS

"a brilliant green for unbleached kraft"

This bright green is only one of the many shades offered by National Aniline for coloring kraft papers and board.

If you are currently running or contemplate running colored kraft to meet growing demands, you'll find you can save time and costly "mill experiments" when you utilize National "know how". And remember you can always depend on the service and prompt delivery from nearby warehouse stocks of National Paper Dyes.

NATIONAL PAPER DYES

NATIONAL ANILINE DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.
Boston Providence Philadelphia Chicago San Francisco
Portland, Ore. Greensboro Charlotte Richmond Atlanta
Los Angeles Columbus, Ga. New Orleans Chattanooga Toronto

BABY-SITTER for Boxboard!

HURLETRON

AUTOMATIC CALIPER and WEIGHT CONTROL

- Holds wet end fluctuations to plus or minus one point
- Measures thickness at 40" intervals clear across the sheet
- Makes corrections by regulating flow of stock but only when a trend has been established
- Provides a continuous, permanent record of wet end caliper
- Signals operator when a drift across the sheet is indicated
- Provides a continuous reading and record at the dry end

When a batch of boxboard is in its infancy . . . at the wet end, that is . . . it needs watching aplenty. It can get out of caliper while your machine tender has stopped for a smoke. And before long you've wasted a lot of raw material . . . produced a roll or two of overweight stock . . . and added some red ink figures to your production costs.

But it's a different story when your Hurletron Caliper Control is on the job. It never sleeps . . . never takes time out. It catches an out-of-caliper condition instantly . . . watches it until a certain trend has been established . . . then quickly corrects the situation . . . while keeping a continuous record of the entire operation at both the wet and dry ends. And it's all done automatically . . . without fuss and bother . . . without any attention from your machine operator.

Attention like that is worth a lot of money to you . . . but it doesn't cost a lot for Hurletron equipment actually pays for itself very quickly through direct savings. This has been proved in dozens of Hurletron-equipped mills.

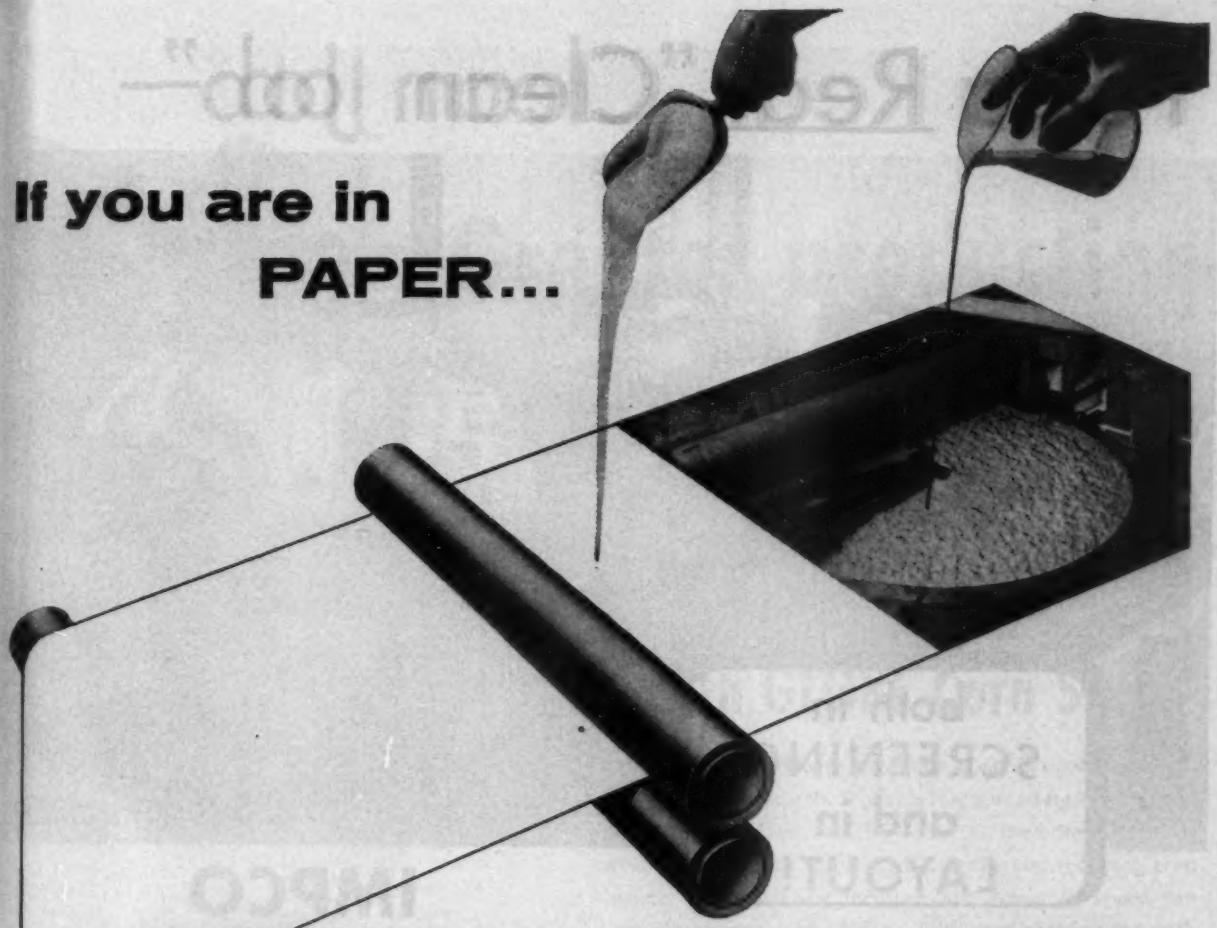
Want to know more about it? Write, wire or phone us. There's no obligation.

ELECTRIC EYE EQUIPMENT COMPANY

1936 EAST FAIRCHILD STREET, DANVILLE, ILLINOIS

Manufacturers of: Hurletron R.O.P. Color Registration Controls; Automatic Controls of Caliper and Weight on Paper and Board; Center Line and Side Web Guide Controls; Cut-Off and Back-Up Controls; Slitter Controls; Moisture Controls.

If you are in PAPER...



...Look at A-C* Polyethylene

emulsions ***hot melts***

A-C POLYETHYLENE is "in" in the paper industry! Manufacturers and converters alike are using these unique polymers in both emulsions and hot melt applications.

Right now—

Paper makers are trying A-C POLYETHYLENE emulsions in the beater and as a pour-on at the calender stack.

Converters not only improve scuff resistance with it, get increased and retained gloss at higher temperatures, but thanks to A-C POLYETHYLENE-fortified coatings, they are coming up with outer wraps for frozen food cartons that seal, stay glossy, and resist cracking at low temperatures.

An interesting possibility—

By working together, paper makers and converters may upgrade sheets—prior to converting—with emulsifiable A-C POLYETHYLENE. Then, by altering the coating weight of the hot melt, new grades, new finishes, new papers might result.

On your sheet and in your sheet—

A-C POLYETHYLENE is easy to handle, easy to use on your present equipment. You can add it as an ingredient in your paper, apply it as a coating.

Test in your own plant—

If you are in any phase of paper—from pulp to the creation of functional packages—look at A-C POLYETHYLENE. When writing us for samples and technical literature, please specify your intended use. It helps us give you the proper information.

Allied Chemical

SEMET-SOLVAY PETROCHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
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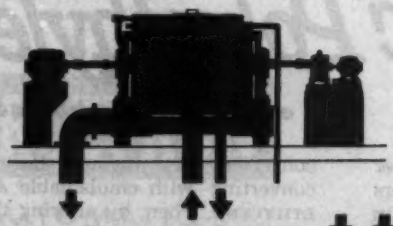
NEW YORK • CLEVELAND • CHICAGO

*Trade mark

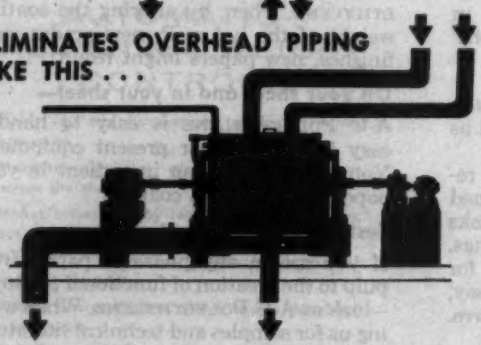
For a Real "Clean Job"–

both in SCREENING and in LAYOUT!

INSTALLED LIKE THIS . . .



ELIMINATES OVERHEAD PIPING LIKE THIS . . .



IMPCO LINDBLAD PULP SCREEN

As a top performer in pulp screening, the Impco Lindblad has many outstanding features. For instance, due to its unique vat design, at no extra cost to the mill, sub-floor piping is possible. This means significant savings in piping expense on the runs for inlet and outlet piping. The neat arrangement provides uncluttered tending aisles and requires minimum floor space in either single or multi-screen installations.

These higher density type vibrating units are delivering quality pulps at densities above 1.5% A.D. in bleached, unbleached, semi-chemical and board mill installations.

For complete information on this screen, send for Bulletin B4-1.

IMPCO®

IMPROVED MACHINERY INC.

NASHUA, NEW HAMPSHIRE

SHERBROOKE MACHINERIES LIMITED, SHERBROOKE, QUEBEC
Manufacture Similar Equipment in Canada

Greater production of corrugated board ...less waste

with GLOBE Corn Starch

A stronger board with excellent bond is produced when you use Globe Starch. It yields low spread figures because Globe Starch does not stick to metal, the adhesive can be run the full width of the medium, thereby reducing trim waste. When heating facilities are available, speed can usually be increased 10% to 20% over speeds used with other adhesives. Globe is preferred because...

- *high viscosity types are available*
- *it has stable viscosity in circulation*
- *it has increased adhesiveness*

Ask our man for further details and free technical information. Write

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17 Battery Place, New York 4, N. Y.

GLOBE®
brand
CORN STARCH
"Always available"
There is a Globe Starch to meet your every need.

SPELL-DOWN CHAMP-1898

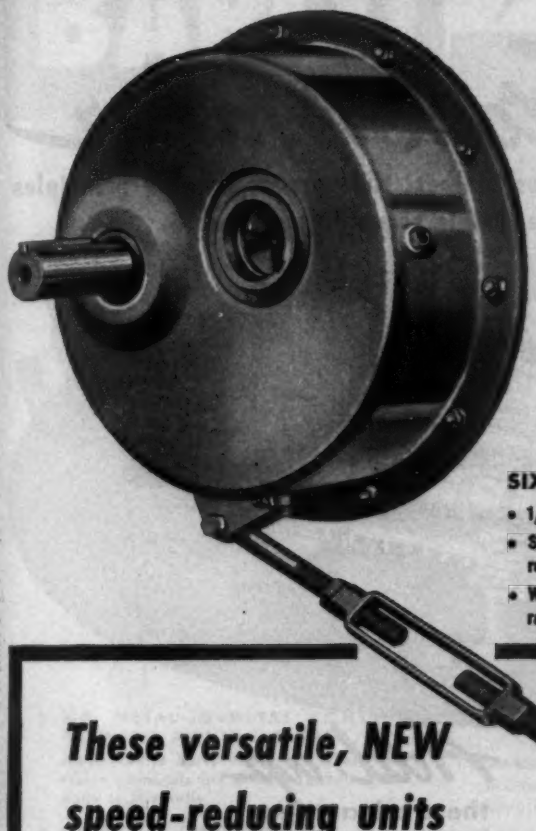
Here's good-natured Joe Becher. As a boy, he was a great speller in school—and great to take off afterwards with pole or gun. And for 53 good years, Joe's well-rounded abilities have been important to efficient felt-making. First a spinner, then a weaver, Joe is a top loom-fixer now—keeping looms steadily on the job of putting a perfect, uniform weave into Appleton felts.

The skill and experience of Joe Becher, and others like him, are characteristic of the Appleton Woolen Mills . . . a 73-year-old organization dedicated to development, progress, and the production of ever finer felts—for the finest paper-making.

APPLETON WOOLEN MILLS

APPLETON, WISCONSIN

Falk ALL-STEEL Shaft Mounted Drives

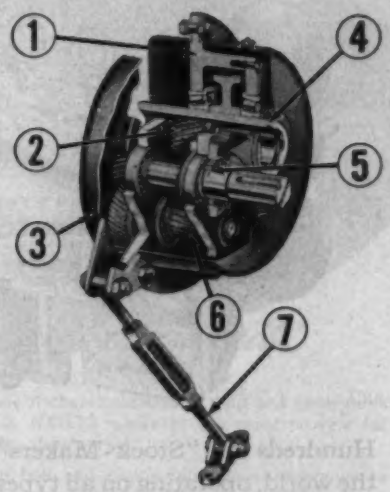


APPLICATIONS UNLIMITED

The range of applications to which the all-steel Falk Shaft Mounted Drive is ideally suited is so wide that complete listing is impracticable. The sketches above are included only to indicate a few typical installations where considerable speed reduction in limited space is an important advantage.

SIX SIZES

- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range—420 to 10 rpm



These versatile, NEW speed-reducing units

save space, power, material and time

Here is the economical solution to the countless application problems requiring efficient speed reduction in limited space! The new Falk all-steel Shaft Mounted Drive—a modification of the universally-accepted Falk Motoreducer design—embodies many exclusive structural and functional features which add up to better service, longer life and substantial savings.

This rugged, compact drive mounts directly on the driven shaft—a distinct saving in floor space. Its precision Falk helical gearing gives highest mechanical efficiency, with a resultant power saving. No adjustable motor bases or slide rails are required. Installation is simple and rapid—output speeds can be quickly changed; thus time is saved...Write to Department 247 for engineering bulletin, including selection and dimension details.

FALK "In-Built" Factors... that give maximum efficiency, convenience and dependability

1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
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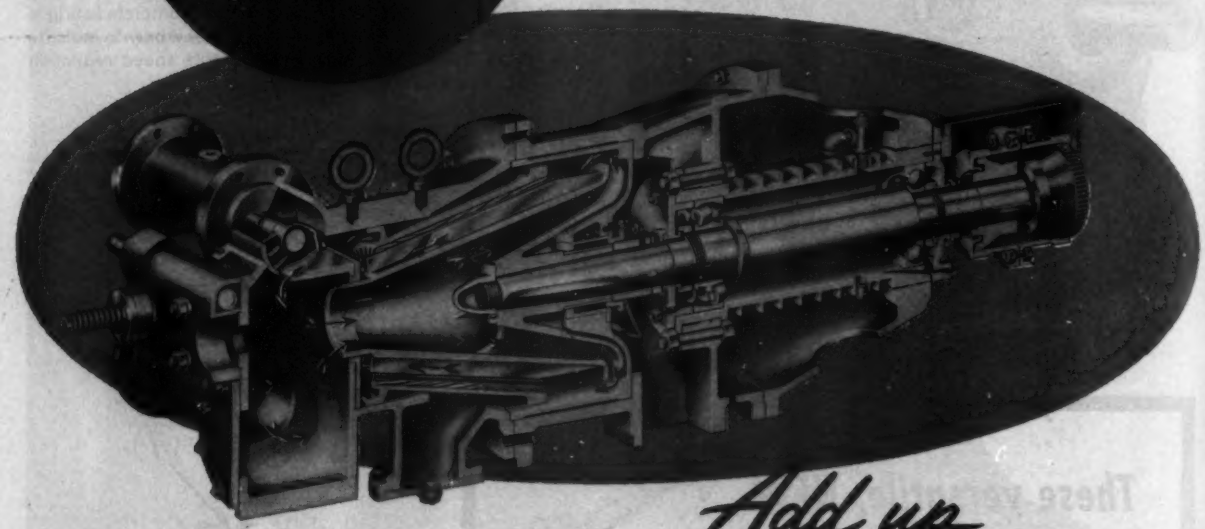
- Contract Machining

FALK

...a good name in industry

MORDEN *Stock-Maker*

combines the best time-proven beating principles into one simple versatile machine.



Hundreds of "Stock-Makers" throughout the world, operating on all types of pulps and grades of paper, have proven the effectiveness and efficiency of "Stock-Maker" beating—from light brushing for soft tissue, to medium treatment for writings, wrappings, etc., on up through extreme hydration for greaseproof and carbon.

"Stock-Makers" can be used advantageously for continuous, single-pass, closed-system beating, direct to the paper or board machine. They can be readily adjusted to handle many variations in treatment requirements.

Add up

these advantages over conventional beaters

- **REQUIRES 1/2 THE POWER PER TON**
- **REQUIRES 1/3 THE SPACE**
- **REQUIRES NONE OF THE LABOR**
- **SAVES MAINTENANCE COSTS**

the Answer... **MORDEN-IZE!**

MORDEN SLUSH-MAKER FOR PULPING
MORDEN STOCK-MAKER FOR BEATING
MORDEN STUFF-MAKER FOR JORDANING

GET ALL THE FACTS!
Send for "Stock-Maker" brochure.

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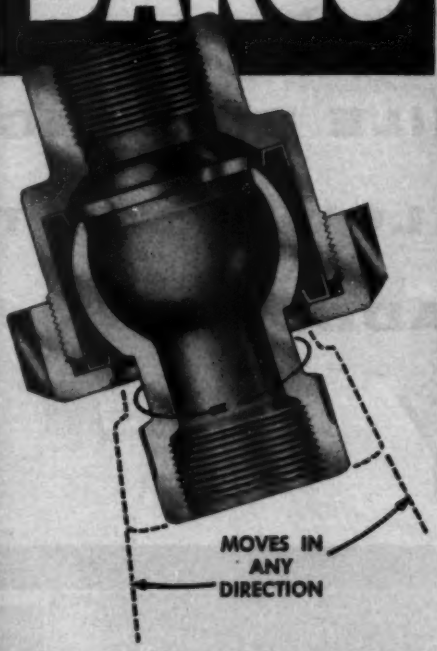
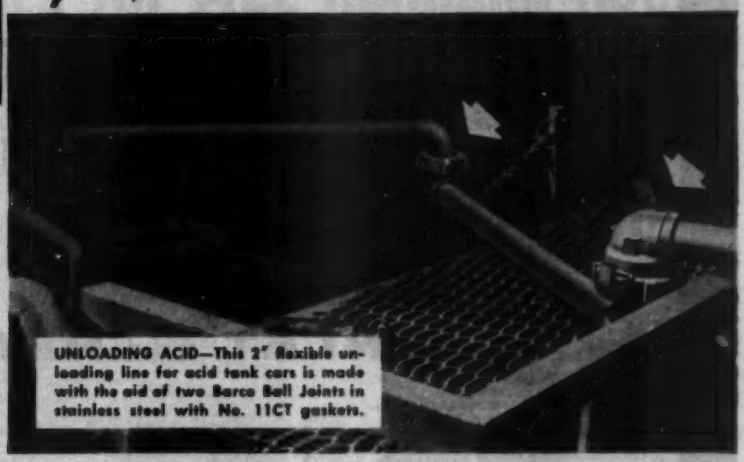
Midwestern States Representatives:
DAN B. CHAPMAN, Appleton, Wisconsin

Other Representatives in most paper-making countries.

BARCO *Flexible* BALL JOINTS





UNLOADING ACID—This 2" flexible unloading line for acid tank cars is made with the aid of two Barco Ball Joints in stainless steel with No. 11CT gaskets.

... for handling

ACIDS · CAUSTIC SOLUTIONS BLEACH CHEMICALS

in Pulp and Paper Mills

Leading manufacturers of all kinds of chemicals used in pulp and paper mills recommend use of BARCO BALL JOINTS wherever you must provide for *flexibility* or *movement in piping.* Here's why:

Barco's *standard* malleable iron ball and casing offer good resistance to chemical action and corrosion. Where additional protection is desired, these parts can be supplied in stainless steel or virtually any alloy specified.

Barco's new No. 11CT gaskets are impervious to chemical action and maintain a tight seal without interfering with the easy turning action of the joint. No lubrication is required.

One Barco Ball Joint will do the work of two or more swivel joints because it *"moves in any direction."*

Barco Ball Joints can help you in many ways. Use them in your mill! Barco also makes revolving joints (for continuous higher speed rotation), swivel joints, and swing joints for other kinds of pipe movement. For complete information, write BARCO MANUFACTURING CO., 526K Hough St., Barrington, Illinois

1. **NO METAL-TO-METAL CONTACT BETWEEN MOVING PARTS.**
   An important Barco advantage where corrosive chemicals are present, either externally or internally.
2. **CHEMICALLY INERT GASKETS.**
   Barco offers a choice of seven types of gaskets including No. 11CT for corrosive service. No lubrication required.
3. **STAINLESS STEEL.**
   Also regularly furnished in Malleable Iron, Steel, Bronze, and Aluminum. Other special alloy joints to order.
4. **MAXIMUM FLEXIBILITY.**
   Up to 40° side flexibility with 360° rotating movement.
5. **PRESSURE SAFE! FIRE-PROOF!**
   Unequalled for SAFETY where flexible connections are required.
6. **MANY STYLES AVAILABLE.**
   Angle or straight; threaded or flanged connections. For pressures to 7,500 psi; temperatures to 1000° F. 15 different sizes. ¼" to 12".

SEND FOR THIS BULLETIN No. 215

DIGESTER—4" Flanged Barco Malleable Iron Ball Joints with No. 11 gaskets give excellent service in connecting piping to slow revolving spherical digesters.

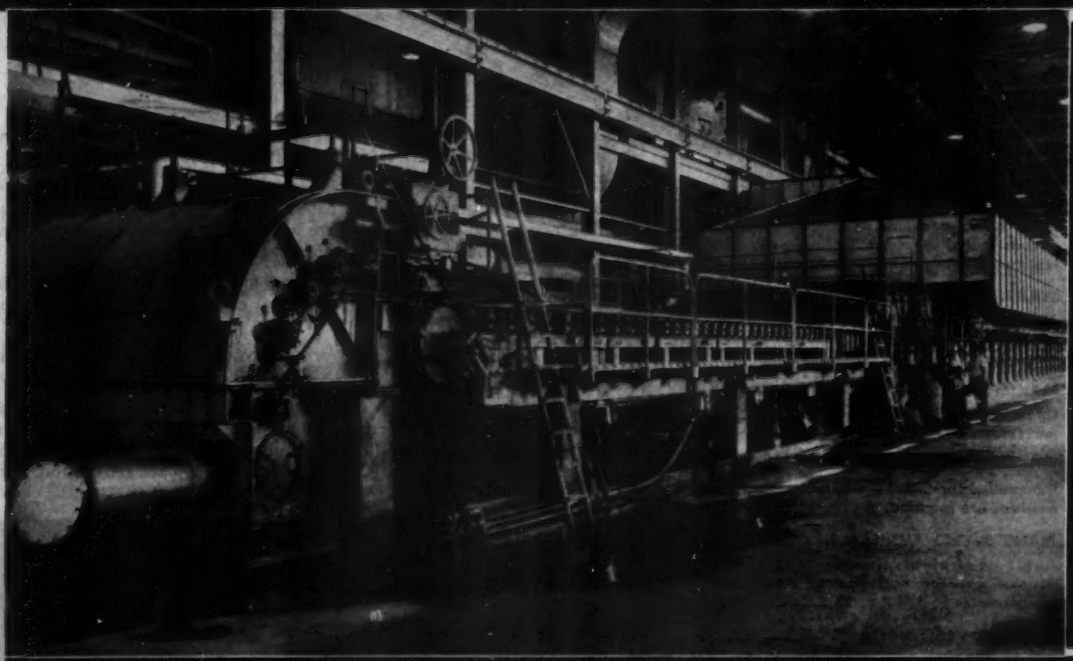
famous for **FLEXIBILITY**

adjustments made **WHILE RUNNING**

BETTER PAPER and **LOWER COST**

with **INLET** and **HEADBOX** by

VALLEY



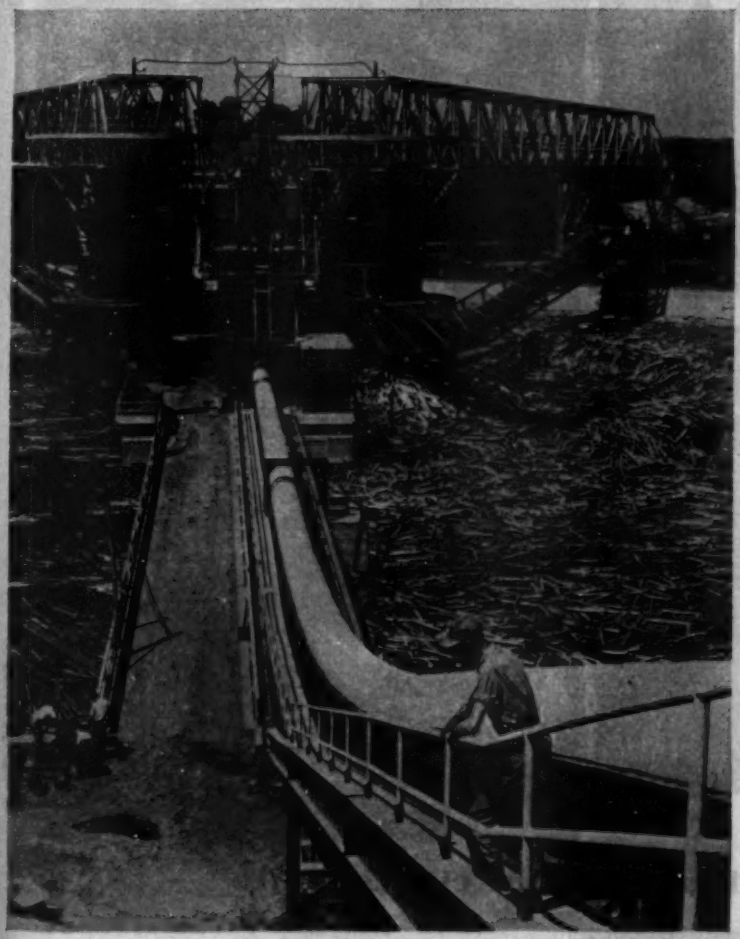
for detailed information write

VALLEY IRON WORKS CO. APPLETON, WISCONSIN

Canadian Representatives: Pulp & Paper Mill Accessories Ltd., P.O. Box 903, Station "O" Montreal 9, Quebec

Pulpwood...chips...chemicals...rolls

here's ONE source for ALL handling needs



The new gigantic $60,000,000 newsprint and pulp mills of Bowaters Southern Paper Corporation, Calhoun, Tennessee, uses Link-Belt gantry cranes, log feeders and stackers, turntable machinery, chain conveyors for delivering logs to grinders, belt tripper, apron conveyor and bucket elevator for limestone, disc screen and power transmission machinery.

Depend on LINK-BELT for a single component or complete system

Modern pulp and paper mills use Link-Belt equipment in scores of materials handling applications. Dependable conveyors, feeders, elevators, and vibrating screens provide smooth, uninterrupted flow of logs, chips, pulp and paper . . . handle fuel, chemicals and waste. And wherever dependable power transmission is required, mills rely on Link-Belt drives to supply it.

No matter what you need in conveying and power transmission machinery, you're sure to find it in the complete Link-Belt line. We'll design, equip and erect the entire materials handling installation . . . and accept full responsibility for its successful operation.

Take advantage of the experience and service that Link-Belt offers. Engineering specialists are conveniently located in sales offices throughout the country. Call the one nearest you and learn how Link-Belt equipment and engineering can increase the efficiency of your materials handling operations.

LINK-BELT

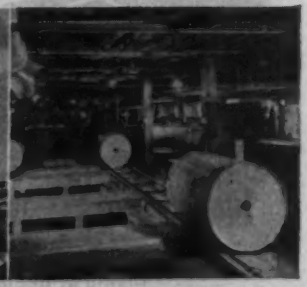
One source . . . One responsibility for Materials Handling and Power Transmission Machinery

TYPICAL LINK-BELT EQUIPMENT SERVING THE PULP AND PAPER INDUSTRY

In woodyards, logs are conveyed to storage or direct to barkers by either Link-Belt chain or belt conveyors.

Link-Belt conveyors, feeders, vibrating screens handle and classify large volumes of a wide variety of bulk materials efficiently.

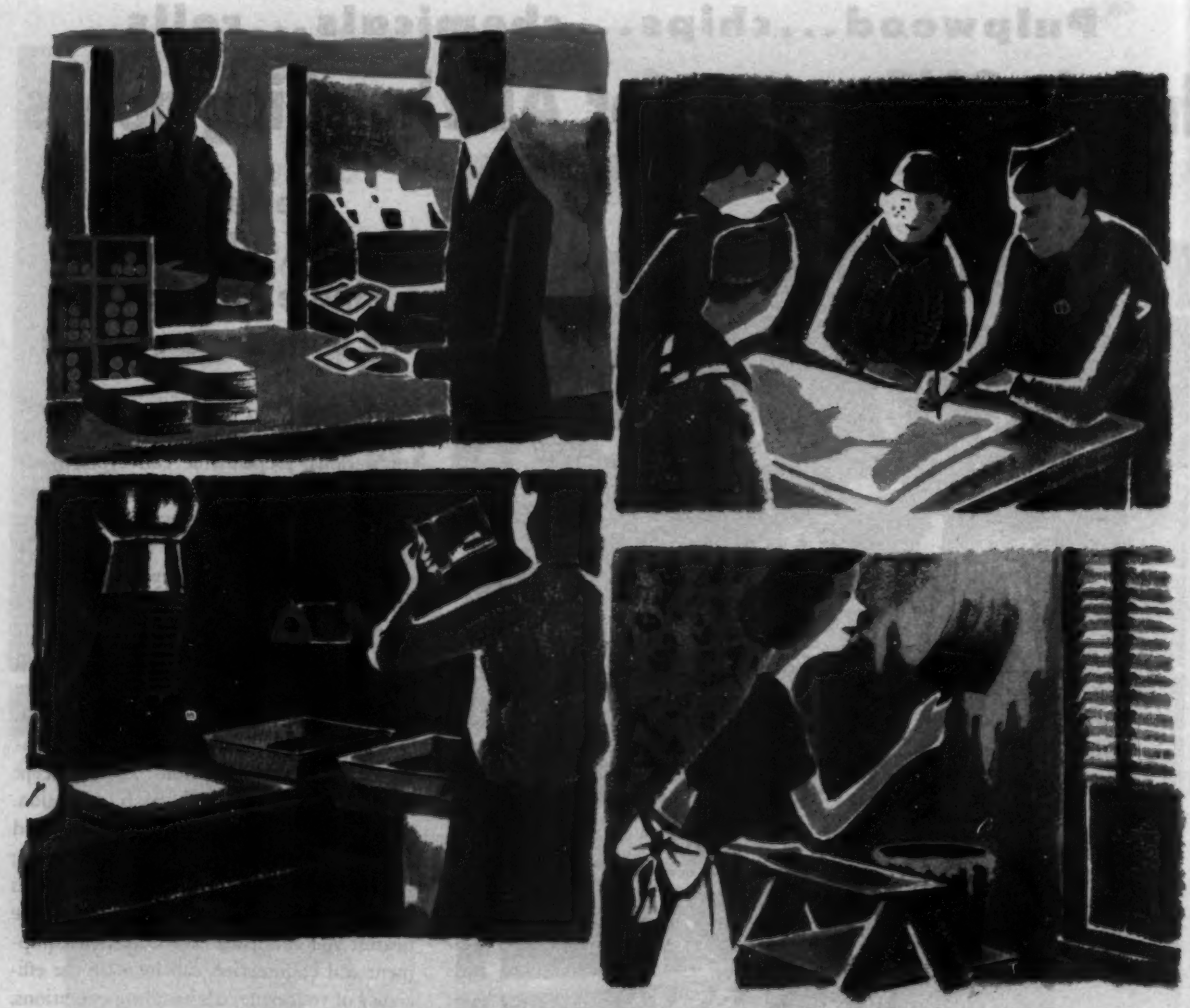
For coal and bulk chemicals, you get the right mechanical handling equipment from the complete Link-Belt line.



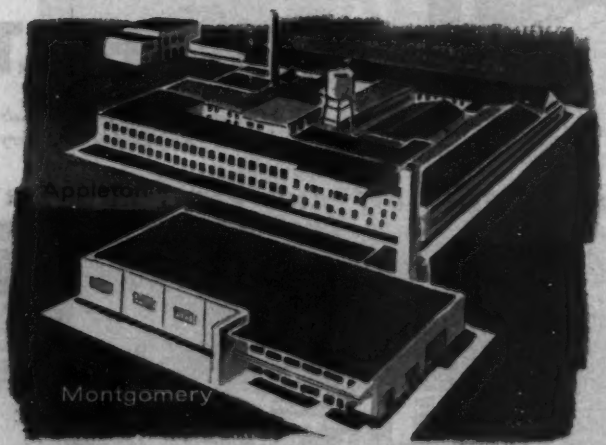
Link-Belt conveyors and drives coordinate the movement of heavy rolls of paper from machine to final shipment.

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

12,877



Paper adds zest to our civilized life



General Offices, Appleton, Wisconsin

Plants at Appleton, and Montgomery, Alabama.

Specialty paper for money—and then for so many useful, vital, often exciting things money buys. Print a photo or read a map—filter liquids or light a cigarette—wear a party hat or paper the walls—build a condenser or buy a ticket... paper, paper everywhere—helping keep our modern way of life interesting, colorful, productive.

And in at the very start of specialty papers—in every field where paper goes to work... Fourdrinier wires. Appleton Wires. Good wires—by a 59-year test of industry-wide acceptance and use.

Appleton Wire Works, Inc.

look at both sides

. . . of TITANOX®-pigmented paper. You'll find legibility is up because TITANOX titanium dioxide keeps show-through down.

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Atlanta • Boston • Chicago • Cleveland • Houston • Los Angeles • Philadelphia • Pittsburgh • Portland • San Francisco
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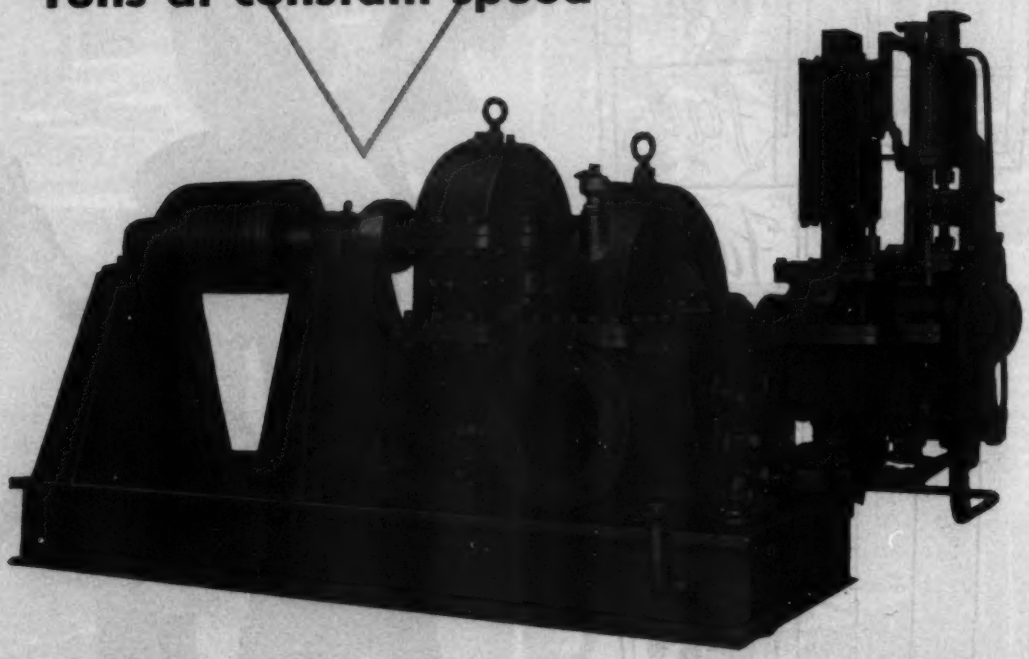
to hold oil temperature constant

while this Worthington Steam Turbine Drive

runs at constant speed



A ROSS EXCHANGER

Furnished to provide constant-speed operation for paper machines, this Worthington single stage steam-turbine drive has been designed to hold, within 1/10 of 1%, the speed at which the governor is set — regardless of load changes.

To hold oil temperature constant . . . to safeguard bearings and other close clearance parts . . . the Worthington Corporation factory-installed a Ross Exchanger. Continuous re-cooling of lube oil is thus assured!

Regularly selected for their high thermal efficiency and proved ruggedness, Ross Exchangers are utilized throughout the paper and pulp industry: on calenders, super calenders, paper making machines, paper machine dryers, hardboard presses, pulpwood grinders, rewinders, turbine drives, engines and compressors — for cooling lube oil, jacket water and hydraulic fluid.

Completely pre-engineered and fully standardized, Ross Exchangers are promptly available in a wide range of sizes to meet a wide range of requirements.

Bulletins 1.1K5 and 2.1K1 give detailed information. Write.

KEWANEE-ROSS CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

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Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

AT BOWATERS
SOUTHERN PAPER CORP.

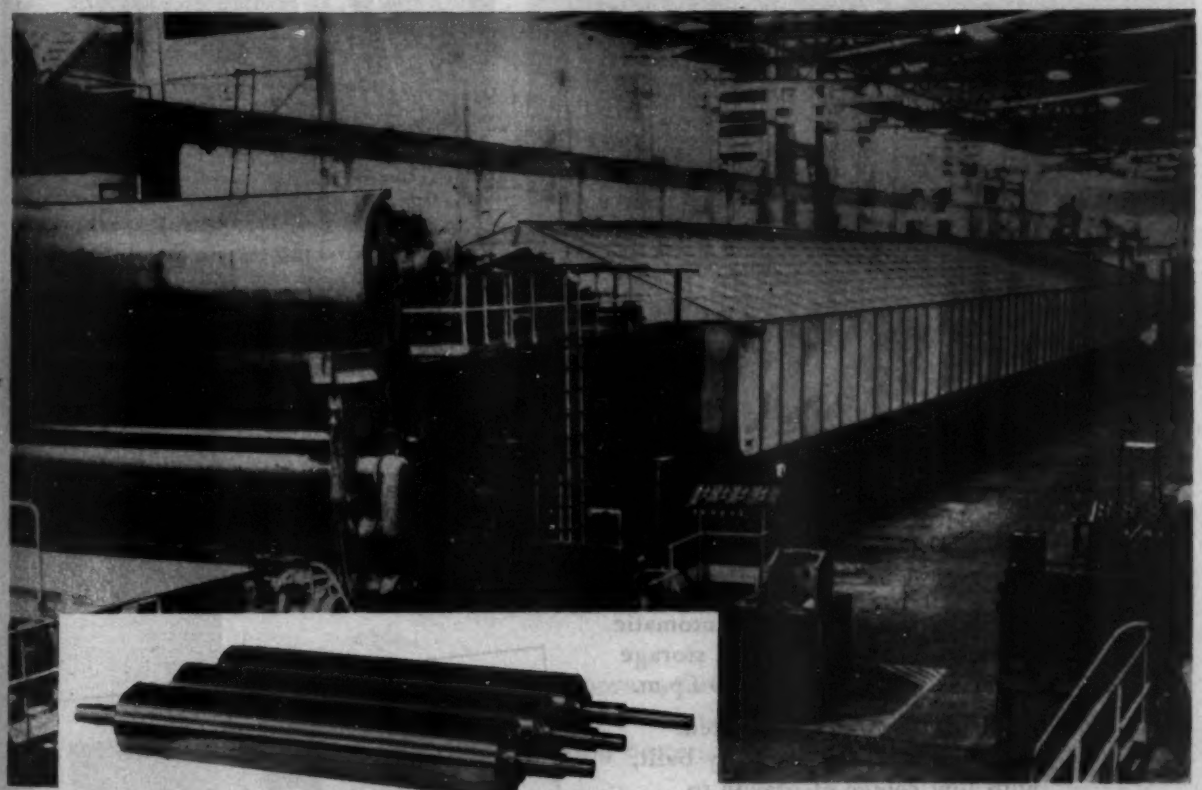
Weldco

SPEEDS UP PRODUCTION...
MAINTAINS HIGHER QUALITY!

• Modern, high-speed paper production calls for the finest, newest, most efficient equipment. So when Beloit Iron Works designed two 256" Newsprint Machines for Bowaters Southern, WELDCO Monel Roll Covers were specified for the Auto Guide, Stretcher, and Wire Rolls. Ten rolls, 18" diam. x 21'4" face . . . the largest rolls of this type ever covered . . . were coated with 3/16" Monel.

You'll find WELDCO-Covered Rolls in many other mills, too, because they offer maximum corrosion-resistance, reduce friction, increase felt life, and lessen wear on fourdrinier wires. Their smooth, highly-polished surface won't chip, peel, crack, or blister — gives many years of economical service with very little maintenance.

Both new and old rolls can be covered with Monel, Stainless Steel, Nickel, Inconel, or other alloys, by the patented WELDCO "Pressure Welding" process. For your next machine — new or reconditioned — be sure to specify WELDCO Rolls. Ask your paper machinery builder about them, or contact us direct.



THE YOUNGSTOWN WELDING AND ENGINEERING COMPANY

WELDCO

3727 OAKWOOD AVE. YOUNGSTOWN 9, OHIO

Appleton Twins For Dual Economy

A new Appleton supercalender to increase production. A modern Appleton rewinder for more speed. Team them up for *twice* the efficiency to cope with today's higher costs.

Appleton supercalender illustrated: 150″ 12 roll, has shaftless unwind arrangement and automatic roll handling from elevated storage platform. Operates at 1800 f.p.m.

Appleton rewinder illustrated: 150″ 2 drum, also ruggedly built, with low center of gravity to assure vibration-free operation. Operates at 3500 f.p.m.

A
APPLETON MACHINE COMPANY
APPLETON
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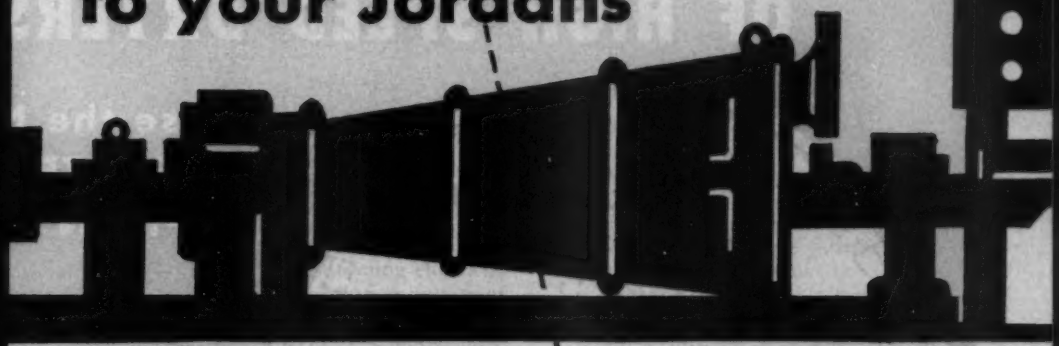
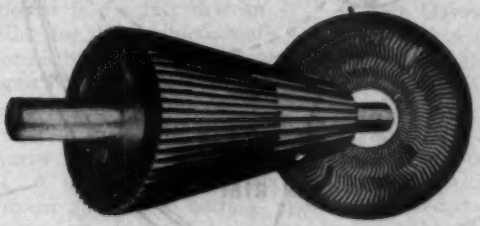
CUSTOM BUILDERS OF PULP, PAPER & TEXTILE MACHINERY · CALENDERS · FINISHING ROLLS · REWINDERS · SCREENS · DECKERS

BE GOOD* to your Jordans



and they will be good to you



Whatever Jordans you use — old or new — their quality of performance depends on the **Plug and Shell Fillings.**

Equipment, facilities and years of specialization make Bolton unique as suppliers of superior Fillings **that fit any Jordan — in any design — in any metal.**

KNIVES are supplied in any size, shape or design for brushing, cutting and all variations in between.

WOODS supplied are our own selected kiln-dried oak, maple or South American hard wood. Special material separators are also available.

RIGID PLANT CONTROL governs the complete fabrication of all **BOLTON Fillings** from the raw metal, right through our own special heat-treating and machining processes, to the finished product.

Be good to your Jordans — **get BOLTON Fillings** — and your Jordans will be good to you.

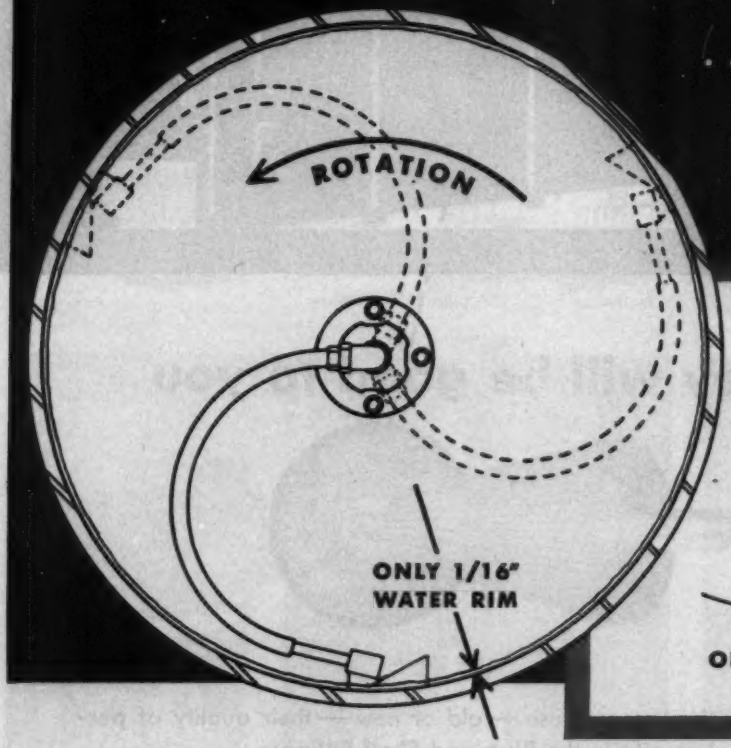
John W. BOLTON & Sons, Inc.

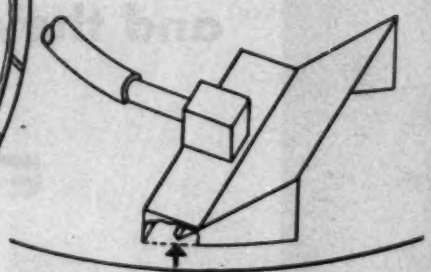
EMERSON MANUFACTURING DIVISION

Lawrence, Massachusetts, U. S. A.

HOW TO IMPROVE DRAINAGE OF HIGH SPEED DRYERS

. . . Use the NEW ARMSTRONG SYPHON SCOOP





Reduces Water Load and Horsepower Requirements— Improves Heat Transfer — Reduces Maintenance

● With the Armstrong Syphon Scoop you can get better drainage and greater efficiency from high speed paper machine dryers than was ever before possible. Until it was developed, there was no device that would work efficiently regardless of dryer speed. Those that worked best at high speeds failed at low speeds and vice versa.

At high speeds, stationary syphons or revolving syphons or scoops permit a rim of water to build up to depths of as much as ½" around the inside of the dryer shell. Heat transfer is reduced, the extra water load increases the power load and and cascading water often breaks stationary syphon pipes.

With the Armstrong Syphon Scoop the rim of condensate cannot exceed 1/16" in depth as shown in the diagrams above. At speeds below rimming, the generous sized scoop removes condensate as fast as it accumulates in the bottom of the dryer. As a result, superior dryer performance is secured at all times. Heat transfer is improved, horsepower requirements are reduced and there is no maintenance problem.

●

A COMPLETE DISCUSSION of this subject together with test data is available upon request without obligation. For more output at lower cost, write to:

ARMSTRONG MACHINE WORKS

816 Hoffman Street • Three Rivers, Michigan

Syphon Scoops—Dryer Drainage Traps
Moisture Control Systems — Steam Humidifiers
Individual Dryer Temperature Controls

CURRENT COMMENTS

Businessmen in government . . . boom in paper demand . . . and stronger paper

The recent episode concerning the resignation of Secretary Talbot from the Air Force, combined with the continuing efforts of New Deal sympathizers to question the administration polyicy of accepting the services of high-salaried business executives in government service without pay, does little to encourage businessmen of ability to accept any form of government position. The opposition to such utilization of the nation's business talent dovetails with the miscalled progressive program of subjecting government operations to the sometimes-vagaries of professional politicians. That there is a place in government for career men is unquestioned, but equally unquestioned is the fact that an executive accustomed to being responsible for the production of profit by multimillion-dollar corporations is better able to master the intricacies of government, the biggest business of all.

In the face of this tendency to question the patriotism of businessmen who give their talents to government, Reuben B. Robertson Jr., former president of Champion Paper & Fibre Co., has been welcomed into the official family at Washington as the right-hand man for Secretary of Defense Wilson. Recognition of the importance of his talents to the nation was shown first by his being offered the position, and then by the Senate's unanimous action in approving him. In authorizing his appointment, the Senate allowed him to retain a directorship in the company of which was former executive head, although he has resigned his official position and has disposed of all securities in companies doing business with the government.

Great gains in paper industry

Midsummer has seen an astounding upturn in paper demand and sales, and numerous financial reports show an almost unanimous increase in net earnings. Tonnage has increased 11 per cent over the first half of 1954; and if present production is continued for the balance of the year, the total amount will closely approximate 30,000,000 tons, a figure which would have been regarded as impossible to attain when the year opened. A compilation of income reports of 27 paper and allied products companies by the First National City Bank of New York shows an increase of 11 per cent for the first half of 1955, as compared with the same months of 1954. A more striking evidence of the recent upswing in business, however, is in the figures for the second quarter, which were 22 per cent over those of the second quarter of 1954. The percentage of gain in the second quarter rose proportionately faster than the average for manufacturing, which was 30 per cent for the half year and 33 per cent for the second quarter.

Political box score

In the political field, the Republicans and Democrats are striving to show, each for its side of the picture, the relative accomplishments of the session just adjourned, as matched against the administration requests. The box score is read the way the politicians wish the public to see the story.

International trade standoff

In the field of international trade, the result is a standoff. The President was given the power he requested to conduct a new series of negotiations for reciprocal duty rate reductions, with limitations included which did not appear in the original program. The efforts to pass a so-called customs simplification bill bogged down in the Senate Finance Committee and will remain pigeonholed until 1956. The senators favored true simplification but were impressed by the argument that the meat of the bill was in fact a nonreciprocal across-the-board tariff rate reduction by changing the basis for computing duties on foreign values. The efforts of some groups to have Congress authorize a transfer of hardboard from the paper schedule to the wood section of the Tariff Act, with an increase of 100 per cent in the duty rate, were canceled by agreement between representatives of the Senate and the House of Representatives. The Senate Finance Committee was informed by Chairman Cooper of the House Ways and Means Committee that the domestic producers, with Masonite as principal spokesman, did not wish to make an issue of the matter at this time.

As a result of the extension of the Reciprocal Trade Agreement Act, State Department agents are accepting requests from foreign nations for consideration of requests for further duty rate reductions. The negotiations will probably affect some 2,000 commodities.

Paper merger controversy

While government eyebrows have been raised at times at the series of mergers in the paper industry, there have been few definite issues raised. In October, however, there will be a hearing in New York on the charge by the Federal Trade Commission that the purchase by Union Bag & Paper Corp. of 25,000 shares of stock of the Hankins Container Co. of Cleveland might tend to lessen competition. The Union Bag & Paper Corp. will claim that ownership of a minority of Hankins stock does not constitute control, even though there may be a partial interlocking of directorates.

Nylon paper

While politics and industry prosperity are paramount in the news, a technical development which may have boundless results on the future of the industry was the first actual commercial run of paper made wholly from nylon fiber. The Riegel Paper Corp. has produced a sheet many times stronger than paper from rag or wood pulps. While the cost is high, the Riegel people believe that increased output would make possible a

Current comments . . .

material reduction in manufacturing costs. The invasion of the paper field by the users of synthetic materials may be the lighting of a new horizon for the industry.

Financial Reports

Paper mill securities followed the leadership of the majority of blue chip stocks which fell off in prices after the Government took steps to tighten up on credits to brokers on stock loans. There was no severe price drop, but buying dried up until sales in the first days of August were the lowest in volume for the year.

Net Incomes

American Box Board Co.—Net income for six months ended May 31 was $1,325,322, as compared with $812,785 for the like period a year ago.

American Writing Paper Corp.—Net six months' income was $325,816, as against $289,028 for the comparable period a year ago.

Brown Co.—Net income for 28 weeks ended June 11 was $700,540, as compared with $954,385 for the like period in 1954.

Certain-Teed Products Corp.—Net half-year income was $3,387,563, as compared with $2,013,767 for the same period a year ago.

Champion Paper & Fibre Co.—Net income for the year ended March 31 was $10,201,717, as against $9,546,312 for the previous fiscal year.

Chesapeake Corp. of Virginia—Net income for 24 weeks ended June 18 was $1,546,030, as compared with $1,351,307 for the like period a year ago.

Crown Zellerbach Corp.—Net income for the year ended April 30 was $32,657,000, as compared with $26,827,864 in the previous fiscal year .

Eastern Corp.—Net half-year income was $573,310, as compared with $404,211 for the same period in 1954.

Federal Paperboard Co. Inc.—Net six months' income was $1,169,000, as compared with $1,631,000 for the like period a year ago.

Fibreboard Products Inc.—Net income for the year ended April 30 was $6,452,480, as compared with $5,538,597 for the previous fiscal year.

Gair Co. Inc., Robert—Net six months' income was $4,403,328 as against $4,021,583 for the comparable period last year.

Gaylord Container Corp.—Net income for the quarter ended June 30 was $2,125,053, as compared with $1,799,723 for the same quarter in 1954.

Glatfelter Co., P. H.—Net six months' income was $1,139,734, as against $907,290 for the comparable period a year ago.

Great Northern Paper Co.—Net income for 24 weeks to June 11 was $2,193,242, as compared with $2,085,825 for the same period a year ago.

Hammermill Paper Co.—Net income for the first half of the year was $1,301,364, as against $718,054 for the comparable period a year ago.

International Cellucotton Products Co.—Net six months' income was $3,478,900, as compared with $3,871,600 for the like period last year.

International Paper Co.—Net income for the first half year was $38,590,953, as compared with $32,415,956 for the like period a year ago.

Kalamazoo Vegetable Parchment Co.—Net income for the nine months ended June 30 was $1,704,324, as compared with $1,695,243 for the same period a year ago.

Keyes Fibre Co.—Net income for the first half of 1955 was $833,399, as compared with $662,594 for the first half of 1954.

Kimberly-Clark Corp.—Net income for the year ended April 30 was $12,757,437, as compared with $10,695,697 for the previous fiscal year.

MacAndrews & Forbes Co.—Net six months' income was $572,050, as compared with $550,038 for the like period a year ago.

Masonite Corp.—Net income for nine months ended May 31 was $3,587,894, as compared with $1,878,860 for the same period a year ago.

Mead Corp.—Net income for 24 weeks ended June 12 was $3,786,741, as compared with $2,473,349 for the like 1954 period.

Minnesota & Ontario Paper Co.—Net half-year income was $2,862,024, as against $2,678,401 for the comparable period a year ago.

National Vulcanized Fibre Co.—Net six months' income was $373,400, as against $159,305 for the comparable period a year ago.

National Container Corp.—Net first quarter income was $1,625,687, as against $696,942 for the first quarter of 1954.

Nekoosa-Edwards Paper Co.—Net income for the first half of 1955 was $1,446,900, as compared with $1,299,000 for the like period a year ago.

Oswego Falls Corp.—Net six months' income was $1,141,027, as against $1,006,004 for the comparable period a year ago.

Oxford Paper Co.—Net income for the first six months of 1955 was $1,865,207, as compared with $1,749,653 for the like period a year ago.

Puget Sound Pulp & Timber Co.—Net income for the first six months of 1955 was $1,620,137, as compared with $1,600,479 for the same months of 1954.

Rayonier Inc.—Net six months income was $8,045,515, as compared with $5,940,369 for the like period last year.

Rhinelander Paper Co.—Net income for the nine months ended June 30 was $1,223,360, as compared with $1,074,873 for the like period a year ago.

St. Regis Paper Co.—Net income for the first half of 1955 was $8,713,047, as compared with $7,957,391 for the same period a year ago.

Scott Paper Co.—Net first half-year earnings were $11,074,714, as compared with $9,306,746 for the first half of 1954.

Sorg Paper Co.—Net six months' earnings were $278,433, as compared with $219,744 in the first half of 1954.

Sutherland Paper Co.—Net six months' income was $1,750,737, as compared with $2,110,987 for the like period a year ago.

Union Bag & Paper Corp.—Net six months' income was $7,155,294, as compared with $5,479,365 for the same period a year ago.

Warren Co., S. D.—Net income for the first half of 1955 was $1,328,000, as against $1,171,000 for the same months of 1954.

Paper mill corporate changes

Certain-Teed Products Corp. has offered to purchase the outstanding stock of Gold Seal Asphalt Roofing Co. of Chicago Heights, Ill. The offer has been accepted by 95 per cent of the holders of Gold Seal stock. However, Certain-Teed has withdrawn its offer to buy Valspar Corp. stock.

Container Corp. of America has filed with the Securities and Exchange Commission a registration statement for an issue of $35,000,000 sinking fund debentures to mature in 1980. The funds are to be used in part for the probable construction of a new paper mill in the South.

Rayonier Inc. will, as of September 1, redeem all the outstanding $2 cumulative preferred stock at $37.50 per share, plus accrued dividend of 34 cents.

St. Croix Paper Co. directors have voted to split the company's common stock on a two-for-one basis plus a 100 per cent stock dividend, giving present holders of 110,000 shares valued at $25 a total of 440,000 shares valued at $12.50. The stockholders in voting on this proposal will also be asked to approve a loan of $10,000,000 from banks and insurance companies to finance an expansion to cost $13,000,000.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Aug. 10, 1955	July 11, 1955
A.P.W.	*5⅛-5⅜	*5¾-5⅞
Celotex	30⅜	32¾
Same Pref.	*19-19⅛	*19⅜-19⅝
Certain-Teed	25½	28
Champion P. & F.	53½	59½
Same Pref.	*107½-108	107¼
Chesapeake Corp.	53-53¼	*50-50⅜
Container Corp.	66	76
Same Pref.	*101½-102	*102¾-104
Crown Zellerbach	77¾	79½
Same Pref.	103½	*105⅞-106½
Dixie Cup	52½	59
Eastern Corp.	*27½-27¾	30½
Federal Paper Board	31¾	33¼
Robert Gair	29¼	31¼
Gaylord Container	50	50⅛
Great Northern	82½	84
Hammermill	33⅛	32¼
International	104½	108¼
Same Pref.	104¼	104¼
Kimberly-Clark	49⅜	52¾
MacAndrews & Forbes	51	*51-52
Marathon	31½	32¾
Masonite	28½	31¼
Mead Corp.	53¾	67
Same Pref.	*101¼-103	*102½-104
Same Sec. Pref.	65⅜	*73-76¾
Minnesota & Ontario	62¼	68½
National Container	19⅜	21⅞
Same Pref.	33½	37½
Oxford Paper	39	41¾
Same Pref.	100	99½
Rayonier Inc.	34½(new)	96
Same Pref.	37⅛	38¾
Rhinelander	35¾	33
Scott	69⅜	71⅞
Same $3.40 Pref.	*95½-97	*96-97
Same $4.00 Pref.	*102-104	*104-106
St. Regis	40⅞	44
Same Pref.	*102-103	104¾
Sutherland	47½	50¼
Union Bag & Paper	93¼	94½
United B. & C.	*24-24½	24⅜
United Wall Paper	2⅛	2⅛
Same Pref.	*19½-20	..
U.S. Gypsum	268	271¼
Same Pref.	*181-182	*181¼-183
West Va. P. & P.	44	48½
Same Pref.	106⅞-107⅛	*108-110

New York Stock Exchange — Bonds

Celotex 3¼%	99½	..
Champion P. & F. Co. 3¼%	...	...
Mead Corp. 3%	...	97

American Stock Exchange — Stocks

American Writing	19½	18¾
Brown Co. Common	17⅛	17⅜
Puget Sound	59	62¼

*Closing Bid and Asked Prices.

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The Paper Industry

SEPTEMBER 1955

All signs point to record accomplishments in 1955

IN COMPILING THE 1955 highlights in the pulp and paper industry, we have sought the cooperation of the industry, various engineering firms that are active in pulp and paper expansions, and manufacturers of equipment and materials.

While we lay no pretense at presenting a complete picture, the selected number of papers published in this issue bring into focus some definite and clearly defined trends and accomplishments.

The generally stepped-up activity in the pulp and paper industry is apparent from John H. Vogel's article on "Production and industry trends in 1955". It is of interest to note from this article that output generally is at a considerably accelerated rate than that stipulated, for the corresponding period, by the Stanford Research Institute report. In fact, newsprint output is already in excess of that projected for 1960, and by 1957 it is expected to exceed the estimated 1975 output. Other products which have come into strong demand are semibleached sulfate pulp (showing a 43 per cent increase over that of the corresponding period in 1954), dissolving and special alpha pulps (with a 31 per cent increase), semichemical pulp (with a 27 per cent increase), bleached sulfate (with a 19 per cent increase), container board (with a 15 per cent increase), fine paper (with a 10 per cent increase), and construction paper and board (with a 16 per cent increase).

An exceedingly interesting development is the strong foreign demand for United States pulp. Principal demand is for bleached sulfate pulp of papermaking grades, which represents 28 per cent of the total pulp export, followed by dissolving and special alpha pulps, which represent 26 per cent of the total.

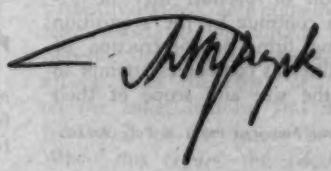
In this connection it is noteworthy that the industry itself is becoming more export-minded and is showing an increasing willingness to meet the demand of the foreign market for both pulp and paper products despite extremely favorable conditions on the home market. For this reason, many firms are organizing their own export departments in addition to operating through export agencies. There is also increased activity in market research shown generally by the industry, and for this purpose many firms are organizing market research programs or are engaging private consulting agencies to do this job.

In pulping, the stage is being set for a rapid adoption of continuous pulping methods for both neutral sulfite semichemical and sulfate pulps. Pulp washing is undergoing a radical change with the introduction of screw presses that discharge pulps at consistencies of more than 60 per cent. Considerable progress is also being made in the development of effective recovery methods for spent neutral sulfite semichemical liquors.

Two Beloit paper machines have achieved record performance in 1955. At Bowaters Southern Paper Corp. newsprint was successfully made at a speed of 2118 fpm, and at St. Regis Paper Co. a 50-lb. multiwall sack stock was put through the machine at a speed of 2200 fpm. The general trend toward greater speeds now establishes the need for balancing all paper machine operations in new machines at 2500 fpm or more.

In the field of new products developed by the pulp and paper industry, there has not been anything as spectacular as the growth and development a few decades ago of the milk bottle. Among the new products developed are Diffusion Board that is said to screen out radioactive dust, poison gas, and germ-carrying particles; paper made from synthetic fibers, the first commercial run of which was carried out by Riegel Paper Corp. in August; Insulite Roof Deck that paves the way for novel and improved construction methods; and paper pallets designed to reduce the cost of materials handling. Furthermore, new and important uses have been found for honeycomb and spirally wound paper tubes.

All these developments promise to single out 1955 as a year of new records in output, performance, improved processes, methods, and market development.



Production and industry trends in 1955

JOHN H. VOGEL*

▶ During the past five months receipts for pulpwood were 14.9 per cent greater than for the corresponding period in 1954; while production of wood pulp and paper and paperboard showed increases of 14 and 11 per cent, respectively

▶ Barring a sharp break in the present economic situation, the industry is well on its way to another production record

AS THE FIRST six months of 1955 came to a close, an observer asked to comment on the trends of this industry could only state they had risen at an accelerated pace, far beyond what the most optimistic forecasters had visualized when the year began, as the demand for its products was at an unprecedented high. That this happy condition should exist at this time is wholly logical, for the use of pulp, paper and board is closely allied with the production and distribution of our national output of products and rendering of services. It is so integral a part of our daily living that, with the great upsurge in industrial and commercial activity, virtually full-employment, and high disposable income, coupled with consumer willingness to spend, it could not be otherwise. This broad use of paper throughout the economy is the keystone of the industry's strength and stability; and as our population increases, standard of living rises and new end-uses for paper and board are developed, the long-term growth of the industry would seem to be assured. To be sure, this will from time to time be interrupted or slowed, be attended by problems, and not be equal for all segments. But growth there will be, and the principal unanswered questions relate to direction and magnitude. It is anticipated, too, that in the years ahead companies which in the past have been successful in achieving positions of leadership in grades where growth is relatively slow will expand into new fields where the probability of increasing demand is greater. Further, the industry trends toward greater integration and diversification of product may be expected to continue by the acquisition of existing firms or construction of new facilities as companies attempt to increase the size and scope of their operations, act to assure themselves of adequate supplies of raw materials, improve the efficiency of their production and distribution facilities, fully utilize timber holdings, and enter into the fields of converted products and production of chemicals—all to improve upon profits and strengthen their competitive position.

In recent years the dynamics of the industry have been partly expressed by acquisitions totaling 69 for the paper and allied products industry during the period 1948-1954. However, while these acquisitions have been prominent, they have been fewer in this industry than in 11 other major industries.

Number of Manufacturing and Mining Concerns Acquired by Industry Group of Acquiring Concern—1948 to 1954 (July 31)

Industry Group	No. of Acquiring Concerns	No. of Acquired Concerns
Nonelectrical machinery	166	249
Food and Kindred Products	100	243
Chemicals	73	168
Fabricated metals	91	161
Transportation equipment	66	125
Textiles and apparel	74	117
Electrical machinery	70	111
Nonmanufacturing	64	96
Mining	48	81
Primary metals	53	78
Stone, clay and glass products	39	70
Paper and allied products	42	60
Professional and scientific instruments	24	47
Lumber and furniture	31	40
Petroleum and coal products	23	35
Printing and publishing	15	24
Rubber products	13	23
Leather products	9	21
Miscellaneous manufacturing	18	20
Tobacco manufacturing	4	4

Source: Federal Trade Commission

The First Five Months of 1955

Pulpwood

Comparable data for the various regions are not available. However, for the industry as a whole, receipts for the first five months of 1955 were almost 1,657,000 cords (14.9 per cent) greater than for the comparable period of 1954. Of this total increase, 100,000 cords were due to larger imports, which have become a factor of increasing importance in the West as United States pulp producers have acquired or made arrangements with the forest industries of Canada to obtain mill residue and waste in chip form. Consumption of pulpwood has increased at the same rate as receipts but the amount, 1,769,000 cords, was greater. As a consequence, mill inventories at the end of May were 10 per cent less than at the end of May a year ago and, at the daily rate of May consumption, equal to 47.5 days supply. This was 14 days less than at the close of May last year.

Wood pulp

Wood pulp production at the close of the period under consideration was 14 per cent greater than for the comparable months in 1954. Semi-bleached sulfate pulp, which is being used in increasing amounts as a replacement for unbleached sulfite pulp, has enjoyed the largest relative increase (43 per cent), followed by dissolving and special alpha pulp (31 per cent); semichemical (27 per cent); and bleached sulfate (19 per cent). These pulps, in the order named, represented 2, 5, 6 and 15 per cent of total production for the first five months but accounted for 5, 9, 11 and 20 per cent of the increase over 1954.

Contrariwise, unbleached sulfate, groundwood and bleached sulfite (papermaking grades), representing, for the year to date, 37, 13 and 9 per cent, respectively, of total output, accounted for only 32, 9 and 4 per cent of the over-all increase in production. Thus, while all paper-making grades, save soda pulp, were being manufactured in larger volume than a year ago, the trend toward increased pro-

*Economist, American Paper & Pulp Association.

duction of bleached sulfate and semi-chemical pulps continued to be noteworthy.

Foreign demand for United States pulp is being maintained at a somewhat higher level than that of the third quarter last year and, at the end of May, exports had amounted to 271,000 tons, 127 per cent more than at the same time in 1954. This margin over 1954 will in all probability diminish as the year progresses. Nevertheless, exports which at this time last year were taking 14 per cent of the pulp produced for market are currently requiring 24 per cent of a larger tonnage, and it is expected that when the year closes a substantial improvement over 1954 will have been registered. It is of interest to note that whereas in 1954 dissolving and special alpha pulp was the principal type exported, accounting for 45 per cent of the total, for 1955 to date, bleached sulfate of paper-making grades have been the most important, representing 28 per cent of the total. Exports of dissolving and special alpha pulp, although 34 per cent more than a year ago, now represent 26 per cent of the total.

Paper and board

An examination of production data for all grades during the first five months, as reported by the Bureau of the Census, indicates an increase of 11 per cent over the comparable period of 1954. While virtually all of the major and sub-groups for which data are available have registered improvement, there has been a wide variation in the rate and direction of change, ranging from −11.0 per cent for wrapping paper made from other than unbleached kraft pulp to +35.9 per cent for shipping sack paper classified in the same group.

Newsprint, of the major grades, accounted for 9 per cent of the overall rise in production and experienced the largest relative growth (24 per cent), as the domestic industry, aided by developments in the pulping of hardwoods and further expansion under the favorable operating conditions of the South, continued its rapid and substantial growth. Newsprint manufacture, having been a declining part of the industry for many years as output decreased by 55 per cent between 1926 and 1944, will by the end of this year have virtually regained its earlier peak of about 1.5 million tons. Further, by 1958, when all presently known plans for expansion will have been completed, production, assuming a continuation of the presently high demand, will have risen to about 1.9 million tons. It is of more than passing interest to note that this tonnage, if achieved, will be almost 50 per cent greater than the Stanford Research Institute's projected output for 1960 and almost 20 per cent greater than that calculated for the year 1975.

Another area of major increase has occurred in containerboard, production of which at the end of this period was running about 15 per cent more than at the end of May, 1954. It is true that for this grade part of the increase represents recovery from the relatively low output of the early months last year. Nevertheless, the increase—reflecting the high tempo of industrial activity and consumer purchases—has been striking. Linerboard has been the dominant factor, the increased manufacture of this grade representing 60 per cent of the over-all increase in container-board, while corrugating material and container chipboard accounted for 38 and 2 per cent, respectively.

Fine paper output, after having been relatively constant in recent years, has been at a record high level this year and gives every promise of amounting to 1,450,000 tons, almost 10 per cent more than in 1954 and 6 per cent more than in 1951, when production was at an all-time high. In this instance, it is again of interest to note that, assuming the indicated output is achieved, the growth since 1950 will have been 250,000 tons. This increase is substantially ahead of the rate expected by the Stanford Research Institute whose forecast for the year 1960 is 1,600,000 tons, 150,000 tons more than now appears likely this year, and allowing for only 60 per cent of the advance recorded for the period 1950-1955.

In the fine paper area, the principal part (79 per cent) of the increase over last year has resulted from the larger demand for writing paper. Within the writing paper grades, papers made from rags, representing 12 per cent of the total, have accounted for 19 per cent of the total increase, while chemical wood pulp grades, representing 88 per cent of the total, have accounted for 81 per cent of the year-to-year increase.

Construction paper and board, under the stimulus of the large construction program, are being produced at a rate of 16 per cent more than in 1954, and these grades have been responsible for 14 per cent of the total advance by the industry during this five-month period. Although both hardboard and insulation board mills are producing in a greater volume than last year, insulation board has been the primary source of the gain, accounting for 76 per cent of the increase.

S. R. I. Projections and 1955 Prospects

In this article a number of comparisons have been—and will be—made between the prospects for 1955 and the projections made by the Stanford Research Institute. Although in some instances the forecasts made by the Institute will appear to be questioned, this has not been done to in any way detract from that valuable study. It would, in fact, be unwise to be unduly critical of the conclusions reached by the Stanford group because business cycles cannot be predicted, and nothing is more normal, or expected, than deviation from trend. It is far too early to say what the final results will be.

Herein it has been assumed that 28.5 million tons of paper and board will be produced in 1955, and similar assumptions concerning pulpwood and wood pulp have been made for purposes of comparison. Whether or not these estimates are sound, only time can show, for none can accurately foretell the future. Who, for example, can accurately assess the impact of such events as recently announced restrictions on home loans in this country and credit controls imposed a short time ago by the government of the United Kingdom. Both actions were taken to moderate the present boom and dull the prospects of inflation, but the passage of time is required before it can be known if the actions taken were more or less effective than was calculated. It remains true, then, that the forecasting of economic trends is most difficult because of the host of known and unknown forces involved, not the least of which is that of human behavior which completely defies reduction to a mathematical equation or slide-rule analysis. A short time ago, it was the consensus of experts that the generation of electricity by atomic power plants would not be realized for 10 years. Yet today one small scale plant is in operation, several commercial scale plants are under construction, and the entire timetable has been advanced. In the same field, work is being done by the Quartermaster Corps to utilize radiation in the preservation of food. Although the applications of this technique are presently limited, and numerous problems remain to be solved, past experience indicates that the difficulties arising from the effect of radiation on the color, texture, and flavor of food will in the future be solved. When this occurs, the effects upon

this industry will be multiple. In some areas, such as replacement for metal cans, new opportunities will arise. It is conceivable, on the other hand, that the impact on the frozen food and other packaged food industries will be such as to effect the demand for numerous grades of paper. It is because of the above and developments now only a gleam in the eye of a scientist that the industry's future defies pin-pointing.

Paper and Board: Production, January-May, 1954 and 1955

Description	1955	1954	Per Cent Change	Per Cent of Total increase
ALL GRADES, TOTAL	12,170,387	10,950,958	+11.1	
PAPER, TOTAL	5,295,666	4,850,181	+9.2	36.5
Newsprint	576,641	465,158	+24.0	9.1
Groundwood paper, uncoated, total	361,154	336,266	+7.4	2.0
Groundwood publication and printing paper	275,911	260,397	+6.0	
Groundwood converting paper	63,941	57,668	+10.9	
Miscellaneous groundwood paper	21,302	18,201	+17.0	
Paper-machine coated printing and converting paper, total	527,570	512,035	+3.0	1.3
Coated, one side	52,121	39,405	+32.3	
Coated, two sides	475,449	472,630	+.6	
Book paper, uncoated, total	707,909	665,182	+6.4	3.5
Book publication and printing paper	433,086	406,555	+6.5	
Book converting paper	266,154	249,958	+6.5	
Miscellaneous book paper	8,669	8,669	—	
Fine paper, total	611,636	542,918	+12.7	5.6
Writing paper, total	481,906	427,518	+12.7	
Writing, rag (including index)	59,547	49,408	+20.5	
Writing, chemical wood pulp	422,357	378,110	+11.7	
Bristols, except rag index	49,990	45,430	+10.0	
Cover, text, and colored school paper	36,865	33,240	+10.9	
Thin paper	42,875	36,730	+16.7	
Coarse paper, total	1,550,748	1,438,411	+8.6	9.2
Unbleached kraft paper	1,148,138	1,069,122	+7.4	
Wrapping	176,836	159,962	+10.6	
Shipping sack	326,086	319,629[1]	+2.0	
Bag	375,399	362,266	+3.6	
Other converting	269,817	227,265	+18.7	
Glassine, greaseproof and vegetable parchment	62,120	59,766	+3.9	
Other coarse paper	340,490	309,523	+10.0	
Wrapping	94,558	106,404	−11.0	
Shipping sack	26,082	19,192[2]	35.9	
Bag	27,822	21,685	+28.3	
Other converting	192,028	169,843	+13.1	
Special industrial paper (including absorbent paper)	263,016	221,195	+18.9	3.4
Sanitary tissue stock	587,378	564,481	+4.1	1.9
Tissue paper, except sanitary and thin paper	109,614	104,535	+5.0	0.4
PAPERBOARD, TOTAL	5,528,174	4,934,033	+12.0	48.7
Containerboard, total	3,005,223	2,618,761	+14.8	31.7
Liners	2,013,666	1,784,621	+12.8	
Corrugating material	863,293	714,695	+20.8	
Container chipboard	128,264	119,445	+7.4	
Bending board, total	1,626,973	1,508,792	+7.9	
Folding boxboard stock	1,097,284	1,005,597	+9.1	
Special food board	410,323	401,128	+2.3	
Other bending board	119,366	102,067	+16.9	
Nonbending board, total	403,604	384,907	+4.9	1.5
Setup boxboard, unpasted	320,310	312,680	+2.4	
Other nonbending board	83,294	72,227	+15.3	
Special paperboard stock	454,935	389,009	+16.9	5.4
Cardboard	37,439	32,564	+15.0	0.3
WET MACHINE BOARD, TOTAL	64,096	58,290	+10.0	0.5
Binders' board	19,762	17,037	+16.0	0.2
Shoe board	21,297	20,848	+2.2	0.1
Other wet machine board	23,037	20,405	+12.9	0.2
CONSTRUCTION PAPER AND BOARD, TOTAL	1,282,451	1,108,454	+15.9	14.3
Construction paper	602,252	517,772	+16.3	6.9
Hardboard and insulating board, total	680,199	590,682	+15.2	7.4
Hardboard, density over 26 lbs., per cu. ft.	221,324	199,742	+10.8	
Insulating board, density 26 lbs. or less, per cu. ft.	458,875	390,940	+17.4	

[1]Includes small amount of bleached shipping sack paper [2]Estimated
Source: Bureau of the Census, U. S. Department of Commerce

Pulpwood: Consumption by Region, 1950-55 and 1960

	1950[1]	1955[1]	1960[2]	Change 1950-1955	Change 1955-1960
	(Millions of cords)				
East[3]	7.0	7.7	7.4	.7	− .3
South	12.8	18.6	21.1	5.8	2.5
West	3.8	6.2	6.3	2.4	.1
Total	23.6	32.5	34.8	8.9	2.3

[1]Estimated
[2]Stanford Research Institute
[3]Northeast and North Central Census Regions

In the accompanying tables, 1950 and 1955 are compared with the forecasts of the Stanford Research Institute for 1960, and the net change over the past five years is compared with the calculated change between 1955 and 1960.

Common to each of these tables is the fact that the growth between 1950 and 1955 will, in all likelihood, have been substantially more than that indicated by the Institute. Also, the pattern of this growth does not appear in all instances to be that projected. Both amount and direction are, obviously, important.

With regard to pulpwood, consumption for 1955 has been at a rate of 32.5 million cords, 8.9 million cords more than was consumed in 1950. This growth of 38 per cent over a five-year period has been at a much greater rate than the envisaged 2.3 million cord increase between 1955 and 1960, if the Stanford calculations are correct.

In the instance of the East, wherein the development of data is difficult because earlier census statistics for the region are not strictly comparable with those now being published, it would appear that this year's consumption will exceed the 1960 estimate by some 300,000 cords. Similarly, in the West and South, it must be concluded that either the 1960 projections have been conservative or that the industry's consumption of wood over the next five years will be at a substantially slower rate than during the period 1950-1955. In the past it was expected by some that it would not be until 1957 or 1958 that the South would consume 18 million cords, and a question was raised as to the ability of the region to sustain such a consumption. Yet it appears that this year — two or three years ahead of schedule— that level of consumption will be reached, and plans for further expansion which will raise the wood requirements of the area are being acted upon.

The situation outlined above is also generally true of the forecast of consumption of wood pulp in 1960, exceptions being groundwood, wherein the 1950-1955 increase has been only about 45 per cent of that expected during the 1955-1960 period; defibrated pulp where the experienced and expected expansions are equal, and in pulp used to make non-paper products for which the 1950-1955 increase has been two-thirds of that expected during the next five years. For all other grades, notably unbleached sulfate, the census figures indicate consumption has been grow-

ing at a much more rapid rate than was contemplated for the future.

As previously indicated, among the paper and board grades the expected 1955 production of newsprint is already well ahead of the 1960 forecast and by 1957 will probably outstrip the output estimated for 1975. Interestingly enough, among the grades of paper, only the projected figure for tissue paper — a grade which has enjoyed steady growth since the end of World War II — indicates that the increase between 1955 and 1960 will exceed that from 1950 to 1955. For the remaining grades, the expected growth is from 20-40 per cent less than that which occurred over the last five years.

Among the board grades, the increase over the past five years for container board is three times the expected increase from 1955 to 1960. The remaining grades, boxboard and building paper and board, have experienced smaller increases than are expected in the next five years.

It is clear, therefore, that barring a sharp break in the present economic situation, the industry is well on its way to another production record. Whether, as some believe, we have as a nation passed to a new level and entered a period of growth and general prosperity or are momentarily enjoying a boom based largely upon credit excesses arising from the purchase of automobiles and houses can not be foreseen.

Conceivably, the gains of recent years have now been thoroughly consolidated, and conditions are propitious for a movement to a new level of production. But it should not be overlooked that in the post-war period year-to-year growth has, with few exceptions, tended to be steady but unspectacular. Thus, the bulk of the expansion since 1946 was concentrated in the years 1950-1951, when the war in Korea stimulated output and the rise over 1949 was almost 6 million tons. Since that time, only 600,000 tons, less than three per cent, have been added. It is because of this tendency for output to move forward in a series of steps, each of indefinite duration, that it would be unwise to discount the results of the long-term study by the Stanford Research Institute or assume that the millenium had arrived and in the future movement could only be upward.

Pulpwood Supply — 5 Months, 1954 and 1955

(Cords)

	1955	1954	Per cent Change
Receipts, Total	12,765,378	11,107,852	+14.9
Imported	669,897	568,622	+17.8
Domestic	12,095,481	10,539,230	+14.8
Consumption	13,648,172	11,879,479	+14.9
Inventories	4,359,286	4,866,736	+10.4
Day's Supply[1]	47.5	61.4	

[1]Based on May consumption
Source: Bureau of the Census, U. S. Department of Commerce

Paper and Paperboard: Production, 1950, 1955 and 1960

	1950	1955[1]	1960[1]	Change 1950-1955	Change 1955-1960
	(Millions of Tons)				
Total Paper	10.60	12.55	13.60	1.95	1.05
Fine	1.20	1.45	1.60	.25	.15
Newsprint	1.00	1.50	1.30	.50	−.20
Book & other printing	3.30	3.80	4.20	.50	.40
Coarse	3.30	3.60	3.80	.30	.20
Tissue & other	1.80	2.20	2.70	.40	.50
Total paperboard	11.10	13.00	14.50	1.90	1.50
Containerboard	5.80	7.00	7.40	1.20	.40
Boxboard & other	5.30	6.00	7.10	.70	1.10
Building paper and board	2.60	3.00	3.90	.40	.90
Building paper	1.40	1.40	1.80	—	.40
Building board	1.20	1.60	2.10	.40	.50
Total	24.30	28.55	32.00	4.25	3.45

[1]Estimated
Source: Bureau of the Census, U. S. Department of Commerce Stanford Research Institute

Wood Pulp: Consumption, 1950, 1955 and 1960

	1950	1955[1]	1960[2]	Change 1950-55	Change 1955-60
			(Millions of tons)		
For paper, paperboard and building materials, Total	16.5	20.9	23.1	4.4	2.2
Unbleached sulfate	6.1	7.7	7.4	1.6	−0.3
White pulps[3]	6.1	7.7	8.7	1.6	1.0
Groundwood	2.5	2.8	3.5	0.3	0.7
Defibrated or exploded	0.9	1.3	1.7	0.4	0.4
Semichemical	0.8	1.3	1.6	0.5	0.3
Screenings, etc.	0.1	0.1	0.2	0.0	0.1
For all other products[4]	0.7[2]	0.9	1.2	0.2	0.3
Totals	17.2	21.8	24.3	4.6	2.5

[1]Estimated
[2]Stanford Research Institute
[3]Includes bleached and unbleached sulfite, bleached and semi-bleached sulfate, and soda pulps
[4]Primarily alpha and dissolving pulp
Source: Bureau of the Census, U. S. Department of Commerce, Stanford Research Institute

Wood Pulp: Production, Imports, Exports and New Supply, January-May, 1954 and 1955

(Thousands of Tons)

	1954 Prod.	1954 Imp.	1954 Exp.	1954 New Supply	1955 Prod.	1955 Imp.	1955 Exp.	1955 New Supply	Change 1954 to 1955			
Total	7,468	799	199	8,148	8,501	859	271	9,089	+13.8	+ 7.5	+ 127.7	+11.5
Dissolving and special alpha	302	95	53	344	395	91	71	415	+30.8	− 4.2	+ 34.0	+20.6
Bl. sulfite, paper grades	754	121	12	863	800	142	34	908	+ 6.1	+ 17.4	+ 183.3	+ 5.2
Unbl. sulfite	245	131	18	358	282	143	21	404	+15.1	+ 9.2	+ 16.7	+12.8
Fully bl. sulfate	1,100	235	11	1,324	1,305	245	77	1,473	+18.6	+ 4.3	+ 600.0	+11.3
Semi-bl. sulfate	123	9	1	131	176	18	19	175	+43.1	+100.0	+1800.0	+33.6
Unbl. sulfate	2,779	97	25	2,851	3,115	106	46	3,175	+12.1	+ 9.3	+ 84.0	+11.4
Soda	192	15	—	207	184	17	2	199	− 4.2	+ 13.3	—	− 3.9
Groundwood	1,005	92	—	1,098	1,098	95	—	1,193	+ 9.1	+ 3.3	—	+ 8.7
Defibrated and exploded	483	—	—	483	536	—	—	536	+11.0	—	—	+11.0
Semichemical & other	430	—	—	430	546	—	—	546	+27.0	—	—	+27.0
Screenings & off-quality	57	4	—	61	64	3	2	65	+12.3	− 25.0	—	+ 6.6

Source: Bureau of the Census, U. S. Department of Commerce

Is pulpwood by weight advantageous to all parties?

FREDERICK WIERK*

▶ West Virginia Pulp & Paper Co. at Covington is buying pulpwood by weight — a trend that is receiving considerable attention in 1955. The advantages of buying pulpwood by weight are clearly brought out in this article

THE PRACTICE of buying pulpwood by "scale," whether by some form of cord or cunit, stemmed from sawmill and lumber practice, in which the board-foot and the cord came to be used many years ago. Those volume units are, logically enough, reasonable and practical for the lumber industry since the product is sold, dimensionally, in volume units with qualifications for type of wood, finish, and quality.

From the pulpwood growers to the mills, however, all parties concerned with pulpwood are adversely affected by their respective losses which are introduced by the "scale" practices.

The grower viewpoint and incentive

Problems of the producer of pulpwood on sustained yield are quite different from the problems of his grandfather who may have simply been felling trees for spars, poles, cross-ties, mine props, or saw-logs. The forestry genetics experts may try diligently to convince the pulpwood grower that his proper technique is to grow such species in such fashion, that will give maximum pulp fiber yield per acre per year.

Under scaling practice, the grower has inadequate incentive to produce maximum weight of wood per acre per year. He also has inadequate incentive to give the mill the maximum weight of wood per cord in the mill yard. His main incentive is to have his wood look good to the scaler at the mill gate.

Operating on a weight basis, the grower will readily understand the forest genetics expert. He will understand the mill's desire to get good wood. He will be quicker, and more enthusiastic, about planting better species (that give dense wood) at spacing that will give him maximum weight of good wood per acre per year.

Advantages to the sawyer

Under scaling practice, the sawyer has some conflict in his incentives. He may spend extra time, money, and effort to mark-out and cut the wood so as to present an undebatable load picture to the scaler; or he may be indifferent to stick length, shape, and quality and depend on a "friendly" scaler's appraisal of the delivered wood.

Working on a weight basis, the sawyer need not fuss to measure, mark, and cut to make "good-looking" loads since the stick length tolerance will involve only the maximum dictated, by either highway clearances or such length as a particular mill can handle, as the case may be.

Advantages to the transporter

Under scaling practice the transporter of pulpwood, particularly the trucker, incurs losses. It takes more time and fuss to load a truck so that it may look good to the scaler. Even more notable, it takes time at the mill gate to wait on the scaler. It is not uncommon to see a queue of trucks at the mill gate; and we have seen truckers, tired of waiting, pull out of line and depart, possibly to a competing mill.

On a weight basis the trucker can better handle longer sticks to improve the stability and roadability of his moving load. Prevailing highway clearance limits (8 ft. in most areas) will permit good handling of sticks between 90 and 93 in. crosswise of sills or longer in longitudinal loading. The extra stability of the wider load will reduce the number of overturned pulpwood trucks, too commonly seen along the highways. This is assuming, of course, that the mills can handle longer sticks.

On a weight basis, the trucker may move considerably more ton-miles for the man-hour that he has to pay for. His turn-around time will be notably decreased when the weight basis is established.

Advantages to the mill

The mill simply wants an adequate supply of the best available wood at the least cost. That statement is an over-simplification and may sound trite, but concealed in it are the best arguments for handling pulpwood by weight.

The mill would like to get nothing but sound, hard, dense wood and is willing to pay for it. Nature, however, does not produce exclusively such good wood and, even with the forestry in the best of hands, there will still be much less-than-good wood which the mill will have to take. The mill will take that less-than-good wood but should not be willing to pay as much for it.

Under scaling practice, the mill cannot get either maximum or continuously uniform weight of good wood per cord. There may be penalties for "bad" wood in respect to stick-length, shape, size, or punky condition. There is inadequate premium on, or incentive to deliver, the better wood.

The difference between good, straight, dense wood and small, crooked, punky sticks is evident to a weighing device, without argument. Scaling procedure simply sets the "guess" of the scaler against the "conviction" of the vendor.

At the mill, under scaling practice, there is frequently a bottleneck at the gate which the mill should be happy to eliminate.

In some mills, as in cases where sticks are dragged out of flumes laterally, the design of the conveying equipment may limit the length of stick that may be handled. Most mills, however, are not wedded to a stick length limit, and should be very happy to handle longer wood for the chipper, if only for the very simple reason that the longer stick makes better chips and less sliver waste.

It may be agreed that while weighing, *per se*, will not eliminate all the questionable factors in the mill woodyard inventory problem, continuous and automatic in-and-out weighing is practical and economical. Such weighing would be superior in accuracy to any scheme of "pile volume survey" or just plain guessing. It would reduce the number, and impact, of the variables for which allowances must be made, such as bark, wood, and grit lost by attrition, decomposition, variation in moisture content, etc.

* Reynolds, Smith & Hills, Jacksonville, Fla.

Conveying equipment and machinery for wood waste utilization

F. G. WILSON*

Better conveyor designs and more general use of flumes are yielding double dividends in the form of lower equipment maintenance costs and less degradation of wood from multiple handling and rough treatment

THERE HAVE BEEN several noteworthy innovations in pulpwood handling, storage, and processing, as well as in more efficient utilization of sawmill waste as a raw material for pulp; all of which are part of a growing general effort to obtain more pulp from existing forests. This effort is quite apart from the equally important work being done in forest management, the aim of which is to increase the yield of wood from available lands.

The introduction of underwater storage of pulpwood and the increasing use of paving in woodyards are contributing to the higher yields now being obtained. More efficient chipper designs and better screening are resulting in a steady increase in chip quality and lower chemical consumption per ton of pulp. Better conveyor designs and more general use of flumes for pulpwood transportation in yards are yielding double dividends in the form of lower equipment maintenance costs and less degradation of wood from multiple handling and rough treatment. The promising results obtained to date with chemical debarking indicate the possible elimination of one of the more costly wood room operations, the debarking of wood in drums.

Not the least important factor in more efficient handling and processing of pulpwood is the trend toward better training of woodyard and wood room crews in a laudable attempt to obtain a more uniform flow of wood through these areas. Superintendents are learning the important truth that a moderate production rate, uniformly maintained, results in lower maintenance and a better product than the all-too-prevalent practice of forced maximum production in anticipation of the inevitable shutdown for repairs.

The recent improvements in both mechanical and hydraulic debarkers for saw logs, particularly the former, have enabled sawmills of medium size to remove bark from logs prior to sawing, thus making available for chipping slabs and edgings otherwise usable only as fuel. A more recent development is a successful hydraulic debarker for slabs, which opens the way for collection and utilization of slabs from the multitude of small sawmills which manufacture the greater part of our total lumber production, particularly in the Southeast. Hand-in-hand with developments in debarking equipment have been the improvements in design of chippers for sawmill waste.

Generally, the trend during 1955 and in recent prior years has been toward greater efforts to meet what appears to be an almost unlimited demand for pulp from forest resources which are each day being more clearly recognized as limited. This is achieved through more careful processing and more thorough consumption of available material. Mechanical developments will continue to contribute to this growth in efficiency, as part of the overall development of an industry which is faced with the moral and economic necessity of stretching our pulpwood resources to make the largest possible contribution to our material and, less directly, our intellectual way of life.

Neutral sulfite semichemical pulping

W. F. HUGHES*

New and improved continuous digesters, screw presses that discharge at more than 60 per cent consistencies, and new methods of recovering chemicals for reuse in the NSSC process are making rapid progress this year

WE ARE WITNESSING, in 1955, the most concentrated effort ever expended to further develop the NSSC pulping process. This work is being conducted by equipment manufacturers, chemical companies, and some of the pulp and paper manufacturers. It includes all phases of the pulping process, along with the recovery of chemicals.

Several equipment manufacturers are offering new continuous digesters for the first time, and those with established reputations in the field are offering improved designs. Some of the designs are adaptations or improved versions of existing cookers, while others are completely new in concept. All of this effort and money is not being expended solely toward devolping cookers for the NSSC process, but also for kraft, where the continuous digester is apparently destined to eventually replace the rotary and stationary digesters in general use today.

The refining and washing of NSSC pulp has undergone some radical changes in recent years with the advent of screw presses capable of receiving cooked chips from digesters at consistencies of approximately 10 to 45 per cent, and discharging at consistencies of 60 per cent and more. Some installations are operating satisfactorily where single stage pressing is removing all dissolved solids necessary for satisfactory washing and also reducing the power required to refine the pulp. These presses have proved beneficial to installations that operate only NSSC pulp mills and do not recover any of the chemicals in the spent liquors, as the liquors are removed at high concentrations (about 20 per cent solids) and are either pounded or sold as road binder. Stream pollution has been ma-

*Project engineer, J. E. Sirrine Co.

terially reduced by the installation of screw presses by some of the operating companies.

Most of the early installations used refiners, either single or double rotating disc, immediately following the digesters to refine (or defiberize) the pulp. Either vacuum washers or screw presses were then used (entering consistencies approximately 10 to 12 per cent, discharging at approximately 30 to 35 per cent) to wash the pulp in a single stage, or countercurrently in multiple stages where removal of solids demanded better washing.

With screw presses, it is now possible to squeeze enough of the liquor out of the pulp to completely eliminate washers in most cases; and since this is done immediately following the digesters, the refining with rotating disc refiners is accomplished after washing, reversing the sequence of the early installations. Where an exceptionally clean pulp is required, it is possible to use a combination of screw presses and washers to advantage with the following sequence:

(1) Put the pulp through a screw press to remove a large amount (approximately 85 per cent) of the total dissolved solids;

(2) Refine, and in the process add enough water to bring the consistency of the refiner discharge to about 15 to 16 per cent;

(3) Store in high density chest for about 8 to 10 hours (care must be taken not to store long enough to have fermentation begin);

(4) Wash on cylinder or flat top vacuum washers for final removal of dissolved solids.

Recovery of chemicals for reuse in the NSSC process is making rapid progress; and several methods are under development, some using necessary modifications to conventional recovery furnaces.

In the South, most of the NSSC mills are operated in conjunction with kraft mills where the ratio of kraft to NSSC is 3 to 1 or greater; and in such cases, the two liquors are combined ahead of the evaporators and treated as black liquor. Chemicals in the NSSC liquor are thus absorbed in the kraft liquor system, reducing chemical make-up requirements. Considerable laboratory work is being conducted today to develop other means of recovery and reuse of NSSC spent liquors; and the results of some of this work should be released in the near future. The use of unbuffered bisulfite liquor with corrosion-proof equipment throughout also has promise.

Cotton linters for cellulose

Cotton linters are still an important source of supply for high alpha cellulose, and the year 1955 will see a second major producer start up a plant to continuously cook, wash and bleach linters for the very highest quality of dissolving pulp available on the market. The limited supply of raw linters restricts activity in this field compared to developments in wood pulps due to the supply of wood available.

Developments in high-yield pulping of hardwood

RODERICK O'DONOGHUE**

This article summarizes 1955-thinking in semichemical and chemi-groundwood pulping and lists new pulping and recovery installations

THERE IS AN ever growing interest in the production of so-called semichemical and chemi-groundwood pulps. These processes make it possible to produce pulps with new characteristics from hardwoods. Because hardwoods are generally cheaper and of greater density, there is an economic advantage in their use.

Pulp from both processes can be bleached, and their strengths are generally increased by the reaction. The development will be mentioned separately as the processes are much different.

Semichemical process

In this process the wood is cooked in chip form by a number of chemical solutions. The most outstanding of these is sodium carbonate or bicarbonate. Another is sodium sulfide as used in the sulfate process or sodium bisulfite as used in the sulfite process.

Another solution worthy of consideration is sodium xylenesulfonate as used in the hydrotropic pulping system which has been developed by Ralph H. McKee.

Although sodium sulfite may be bought, it is generally cheaper to make it by burning sulfur and absorbing the resulting SO_2 gas in a soda ash solution. This is done batchwise, or in a continuous manner as conditions dictate.

Sodium sulfide is produced from salt cake by the well known causticizing and sodium recovery systems.

Sodium bisulfite is produced in the same manner as sodium sulfite except for the proportions of sulfur and soda ash used. As it is on the acid side, acidproof equipment is needed.

Sodium xylenesulfonate can be purchased as such or manufactured from xylene, caustic soda, and sulfuric acid.

Actually, very little make-up is required as the cooking liquor may be re-used repeatedly and finally separated from the lignins. How this is done is described in the author's article entitled, "Neutral Sulfite Semichemical Recovery Systems," in the June, 1955, issue of *Tappi*, Vol. 38, No. 6.

This article describes six methods which are proposed for recovery of chemicals when sodium sulfite is the cooking liquor. Of these, the Mead Process is to be installed at the Heald Division of Mead Corp. at Lynchburg, Va. The "Institute" Process has been in operation for some time at the plant of National Container Corp. of Wisconsin, Tomahawk.

Another neutral sulfite process has been developed by the Sonoco Products Co. at Hartsville, S. C., and patents were recently granted. This is an entirely new approach by which acetic and formic acids are recovered, as well as "Rafinate," which is largely salt cake. Sonoco is going ahead with a full scale recovery plant at Hartsville.*

The Watervliet Paper Co. at Watervliet, Mich., is proceeding with an installation of the Mead Recovery Process. This is being built by Babcock & Wilcox Co. The Zimmerman Process, as described, has been in part installed at the Hammermill Paper Co.

**Roderick O'Donoghue & Co., New York

*An article describing this process will appear in the October issue of THE PAPER INDUSTRY.

From the above it can be seen that, finally, steps are underway to overcome one of the difficulties in connection with the N. S. S. C. process—methods to overcome the stream pollution problem and recover chemicals.

There is no standard procedure in cooking, dumping, and handling semichemical pulp. To make pulp for .009 in corrugating medium, the continuous process developed by the American Boxboard Co. at Filer City, Mich. is outstanding. In this process, 350 tons of pulp per day are made using two operators per shift and one for liquor making. The pulp is handled automatically at high consistency from cookers to refiners and then on to screw presses and pulp storage.

It should be anticipated that better grades will ultimately be prepared in similar continuous systems with all operations controlled from a central point.

Semichemical pulps have yields of 65 to 85 per cent depending upon end use. Pulp for bleaching is usually cooked to about 70 per cent yield and then treated in a three stage continuous system consisting of double application of chlorine, caustic extraction and hypochlorite. By giving the pulp a two-stage wash (after chlorination), the chlorine consumption is considerably reduced. A chlorine dioxide stage can also be considered, depending upon certain conditions and the brightness desired.

Chemi-groundwood

This term applies to a new process in which pulpwood blocks are put in a closed container and subjected to a 28-in. vacuum for about 30 minutes. The container is then filled with sodium sulfite cooking liquor buffered with bicarbonate and kept under a pressure of about 175 psi and temperature of 155°C. for about six hours. The liquor is then returned for re-use to an accumulator and the logs discharged into water so as to stop the cooking action by cooling them off.

The blocks are then ground on a conventional pulp grinder at reduced pressure and with a dull stone because the wood is quite soft from the cooking process. As a consequence, the fibers are more of normal length than if ground without prior cooking. Consequently, the resulting pulp is stronger. The yield is about 85 per cent.

The possibilities of this process with hardwoods will have tremendous impact upon mills suffering from the high-price of coniferous woods. It is possible to get different pulp characteristics by changing the basic treatment.

This process is fully described in the booklet entitled, "The Manufacture of Chemi-Groundwood Pulp from Hardwoods," as issued by the New York State College of Forestry at Syracuse University, Syracuse, N. Y., where the process was worked out in a pilot plant. Another pilot plant has been installed at the Harrisville, N.Y., mill of the St. Regis Paper Co. The Great Northern Paper Co. was the first to install a 50-ton semi-commercial plant using a horizontal autoclave at East Millinocket, Maine, which was followed by a 150-ton novel installation which can be expanded to 450 tons.

At the East Millinocket mill, wood is fed through a central revolving chute into the top of one of ultimately six 25-cord capacity vertical digesters. At the bottom is an enormous swinging door which is opened to discharge the cooked pulpwood into a water-filled channel where the blocks cool off.

The author has developed a tilting-type digester which has unique possibilities and can be installed at lower cost.

The process is an outstanding success, and the resulting hardwood pulp is stronger than spruce groundwood. Grinding takes nearly one-half of the power, and the production per grinder is twice as much.

The resulting pulp from most hardwoods is slightly lower in brightness than spruce groundwood. Chemi-groundwood may be bleached after washing in a two-stage hypochlorite system to obtain 70 brightness, or in a peroxide bleaching system. The former gives somewhat better results.

New developments in pulping

M. V. MARTIN*

Continuous kraft digesters (the first unit being installed in Canada), larger diameter valveless pulp washers, improved ClO_2 bleaching methods, high density storage systems for both bleached and unbleached stocks, and wet-bottom recovery furnaces are among recent advances

WHILE THE YEAR 1955 promises to introduce one or two highly significant new developments, most of the important advances may be classified as modifications or refinements to the customary methods of manufacture. Some of these begin in the forests, where private land owners have made giant strides in planting trees for tomorrow's pulpwood. In the last year, more than 800,000 acres were planted, of which 85 per cent is on privately owned land. This is a 13 per cent increase over the previous year and a 133 per cent increase in a six-year period. The heavy planters were the southern states; Florida and Georgia leading with more than 100,000 acres each, including both government and private plantings.

The trial runs on chemically debarked wood and the thorough study just completed on the technique and practicability of applying a toxic chemical to the living tree during sap-peeling season promise to be a boon to many sections of the country where an abundance of hardwoods, especially oak, are available close to existing mills. This is especially important to kraft mills making fine papers, where good barking is essential.

There is a tendency to swing to the use of larger size logs, especially in the Western mills. Many of the new chippers are provided with vanes for blowing or pushing the chips to screens or chip screen hoppers. The use of 100-in. long pulpwood is also gaining in popularity in the East.

Many new techniques are being developed for cooking, such as "VA Purge", prerefining, and high yield for boards. Continuous kraft digesters are now of considerable interest, with the first one on this continent being installed in Canada.

For pulp washing, the trend is toward large diameter and wider units, particularly where those of the valveless type are applicable.

Perhaps the most startling advance is the use of chlorine dioxide for bleaching. In the last two or three

*Project engineer, J. E. Sirrine Co.

years, this method for producing high brightness without excessive pulp degradation is being adopted in most of the new bleach plants. Sodium peroxide is also being used with conventional bleach plants to obtain high brightness.

Within the past year, at least one new bleach plant has put into highly successful production a new advance in chlorine dioxide bleaching which employs no hypochlorites. Also developed in the past year is a three-stage chlorine dioxide bleaching system capable of producing 85 G.E. brightness pulp without caustic extraction. This process is best adapted to locations where color in stream pollution is a problem.

Another newcomer to the bleaching field is the ultra-high density system. Its use is not yet widespread, but it is being studied closely.

High density storage for both bleached and unbleached stocks are now rated as a necessity in most mills. Many wet machines have been discarded in the past few years in favor of the towers. The cost of lapping, storing, and handling compares very unfavorably with the high density storage system.

New developments have been made in the fields of recovery, lime burning, bark burning, and causticizing. Many mills are finding the burning capacity of their kilns greatly enhanced by drying the lime sludge before it enters the kiln.

Another significant improvement in recovery furnace operation is the development of the wet bottom type of furnace. Here the smelt is retained in the molten state to a depth of approximately 5 in. Much of the maintenance connected with recovery appears at this time to be eliminated by not permitting the furnace to drain completely.

Of considerable interest at this time is an agreement recently made between the principal pump manufacturers catering to the paper industry for the standardization of pulp, water, and the other principal types of pumps most used. It is even thought possible to make the parts of these standard pumps interchangeable between the products of different manufacturers. By this means the spare parts and maintenance problems will be greatly reduced.

Developments in rapid continuous pulping

J. N. McGOVERN*

This paper discusses the increase of reaction rates with increasing temperatures and the conditioning of fibrous materials for continuous pulping

THE MANY ADVANTAGES of continuous operation have long been recognized by various chemical and mechanical industries, including the pulp and paper industry. From the early days, of course, paper has been manufactured continuously, and in recent years, continuous bleaching and stock preparation have been installed in practically all new mills and batch converted to continuous operations in many old mills. However, it has only been lately that the production of high-grade paper and board pulps by the chemical and semichemical processes has been proven to be feasible in continuously operated digesters as distinguished from the conventional batch cooking of the past. The production of coarse fiber pulps for felts and wallboard and semichemical pulps for corrugating board by continuous digestion has, of course, been accepted for some time, and this method for these products now can be considered conventional. The purposes of this report are to discuss briefly some of the principles underlying the application of the continuous digester to production of high-grade pulps and to point out the most recent developments in this field.

The reasons for the relatively slow development of continuous operation to the full range of commonly practiced pulping processes have been both mechanical and physicochemical. The mechanical problems have arisen from the circumstance that practically all pulping, excluding groundwood and mechanochemical pulping, is performed under pressure. It has thus been necessary to develop mechanical feeding and discharging devices to operate under pressure and also to develop means to obtain a positive flow of the fibrous material and the cooking reagent through the digester. As is well known, these obstacles have been overcome in the horizontal-tube continuous digester with special feeding and discharging mechanisms as exemplified by the Pandia continuous digester.

The physicochemical problem has been to pulp fibrous materials in extremely short times and yet produce high quality pulps. It is obvious that a short operational time is the basic requirement if the digestion equipment is not to become too bulky and expensive and not too large to lose two of the basic advantages of continuous digestion, viz., close control and uniformity of pulping. Therefore, it has been necessary (a) to take advantage of a fact of physical chemistry that reaction rates increase with increase in temperature and (b) also to minimize the time for conditioning the fibrous material as normally occurs in the temparture rise period in batch pulping.

Conditioning of fibrous material

With respect to conditioning the fibrous material, it is now accepted technically that if this material is

*Chief Process Engineer, Parsons & Whittemore, Inc.

properly conditioned regarding liquor penetration it can immediately enter the reaction zone at full reaction temperature with no ill effects and with possible advantages to the pulping itself. This conditioning has been the subject of considerable investigation in the last few years. In general, the desired conditioning can be obtained by suitable application of pre-steaming, hydrostatic pressure, and vacuum as commonly practiced and by patented procedures, either prior to introduction of the cellulosic material into the digester or within the digester itself. Investigations along this line are still continuing.

Reaction rates

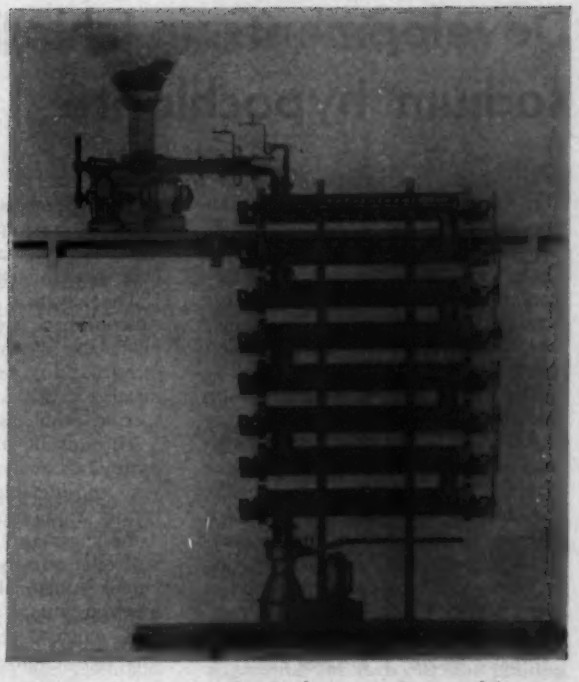
With respect to reaction rate or the length of digestion time and their dependence on temperature, it has been the practice to apply the following rule of thumb factor: reaction rate is doubled for every 10°C. rise in temperature. This temperature coefficient, as it is called, has been very helpful but is, in reality, a rough approximation based on observations regarding behavior in homogeneous organic reaction. Actually, the temperature coefficient is not a constant. This is shown by the data below for the neutral sulfite semichemical pulping of aspen as obtained in laboratory experiments using wood meal to eliminate penetration effects and a constant concentration of sodium sulfite solution*:

Temperature Range	Temperature Coefficient	
(° C.)	75% Yield	85% Yield
170 - 180	3.4	2.3
180 - 190	3.2	2.7
190 - 200	3.1	2.2

Thus, it is indicated above that greater benefits in the way of shortened cooking time can be obtained by increasing temperature than previously was thought possible.

There is also evidence from activation energy data from kinetic studies that the removal of lignin from lignocellulosic materials may be favored at high temperatures in comparison with the removal of the various carbohydrate fractions, assuming that lignin removal is the most important reaction in the chemical pulping processes. In other words, there is a small preferential removal of lignin in comparison with carbohydrate removal at elevated temperatures.

*Data from a publication in preparation at the Forest Products Laboratory, Madison, Wis.



Cross section of the Pandia continuous digester

Commercial applications

Developments along the line discussed above have not, it can now be recorded, been confined to experimental and theoretical considerations. One outstanding case in point is the recent announcement of the development and commercial application of the Peadco process for the extremely rapid pulping of bagasse to produce high quality pulps in the Pandia continuous digester operating at relatively high temperatures. The pulping times are of the order of only 10 minutes.

In another segment of the pulp industry, a United States mill using the Pandia continuous digester is producing bleachable kraft pulp from soft woods in times of the order of 20 minutes, compared with the usual cycle of three hours for the conventional batch operation. This operation was first developed for a sawmill residue of very small chips or a coarse sawdust and has now been extended to include standard pulping chips.

Another application of the rapid continuous digester is for production of bleachable hardwood semichemical pulps. There are two mills in regular production in this field using Pandia continuous digesters. In this case, because of the relative inactivity of neutral sulfite liquor, especially when appreciable lignin removal is necessary, the pulping cycle is an apparently long 40 to 60 minutes. Nevertheless, this is a tremendous reduction in the six to eight hour cycle used in a batch operation at lower temperatures.

In all of the commercial applications above, pulp quality has been maintained or even improved in some respects.

Trend toward rapid continuous digester

It seems now that the trend in modern pulping practice is toward the use of the rapid continuous digester. Experience has shown that the continuous digester itself provides numerous advantages as follows: (1) maximum uniformity of pulp quality due to thorough and continuous mixing of chemicals and steam with the fibrous raw materials; (2) uniform raw material consumption and reduced size of material storage facilities; (3) uniform steam and power requirements which reduce peak load demand in the steam and power plants and allow operation at high load factors; (4) low steam requirements; (5) uniform liquor demand; (6) small space requirements; (7) low labor cost because of greater productivity per man hour of labor; (8) possibility of increasing production by relatively simple and economical additions to the unit itself without disturbing other equipment and without requiring additional space or operators.

The continuous digestion of fibrous materials to produce pulp covering the complete range of quality for the paper industry has been the dream of the pulpmaker for years. That this dream is now coming true is shown by the definite trend in this direction, discernible from the developments in technology and the availability of proven processes and equipment.

Developments in chlorine dioxide, sodium hypochlorite

C. E. HATCH Jr.*

THE UNSTABLE NATURE of chlorine dioxide solution necessitates its manufacture near the point of use. There are two processes currently economically feasible for the large amounts required for bleach plants: the Solvay system and the Mathieson system.

The Solvay method reduces sodium chlorate with methanol in the presence of sulfuric acid. The Mathieson system reduces sodium chlorate with sulfur dioxide in the presence of sulfuric acid. In either case, the evolved gas is absorbed in cold water in a countercurrent packed tower. The solution may be stored only for a relatively short time.

*Chemical engineer, J. E. Sirrine Co.

The refinements in materials of construction, instrumentation, and design methods have made both of these systems safe and effective.

The advances in material of construction have been numerous. Modern plants use a combination of plastics; ferrous and non-ferrous alloys; special metals; glass, and ceramics to solve specific problems.

The advent of a chlorine dioxide continuous analyzer is being watched with considerable interest. The satisfactory application of this instrument to both gas and liquid phase analysis will eliminate the delay and labor inherent in manual analysis. The use of metering pumps for chemical feed has done much to reduce the problems in this connection.

The combined efforts of the two licensing companies, consulting engineers, owners, and equipment manufacturers have resulted in design improvements that have improved the processes and lowered the cost.

Sodium hypochlorite

The heavy demands for sodium hypochlorite bleach have required continuous rather than the traditional batch methods of manufacture. The successful methods of continuous manufacture have depended on a means of control. This has been made possible by the development and application of oxidation-reduction controllers. The correct amount of chlorine may thereby be added to the sodium hydroxide.

Paper machine developments

H. W. MEAKIN*

▶ Specifications for new machines should call for balancing of operations at 2500 fpm or above

HIGH-SPEED MACHINES, particularly on newsprint and light grade papers, have now been accepted as a reality. The recent performance of a large southern newsprint machine above 2100 fpm now dictates that specifications for new machines should call for balancing of operations at 2500 fpm or above. Successful formation on the wire at these high speeds has been effected through removal of air from the furnish, which has been accomplished by improved wire pit designs, particularly by separating and deaerating the saveall tray water from the shower water and by the use in some installations of a deculator. Transfer of the sheet from the fourdrinier to the press section by the use of a suction pick-up roll has proved successful on a number of light weight, high speed installations. A few problems have developed in the dryer section, which are being corrected by modern hood design and vapor absorption systems suitable for the high speed machines.

The problem of handling broke under these conditions has been overcome through improved couch pit designs, the conveying of press broke directly to a large broke storage chest, and the use of high capacity disintegrators at the dry end. Ample storage capacity of broke is necessary in these installations in order to relieve the saveall equipment of unusually heavy peak loads.

Vacuum pump requirements naturally have assumed tremendous proportions, and the number of units necessary has resulted in using one common motor for driving as many as eight pumps, resulting in a saving in space requirements, as well as electrical installation costs. Dryer drainage removal is being accomplished through systems particularly designed for high speed installations.

Electrical sectional drives are keeping pace with increased machine speeds. A number of new installations have been equipped with modern mechanical differential drives, utilizing one large steam turbine as a prime mover.

The application of hot pressing on board machines still further reduces the moisture going to the dryers, which are now being built for 145 psi. Single fourdrinier machines producing 1000 tons a day of this grade are now under construction.

*Project engineer, J. E. Sirrine Co.

Synthetic fibers increase life of papermaker felts*

▶ Technology is being developed for making felts with a higher percentage of synthetic fibers

▶ Felt structures can be made of Dacron and nylon fibers that are extremely wettable. These felts should increase the rate of water transfer from sheet to felt and require less nip pressure to remove the water from the felt structure

"WET" FELTS that last longer and perform better, due to the use of man-made fibers, are the result of conscientious experimentation by the felt manufacturers with new fibers, constructions, and treatments. The du Pont Co.'s Textile Fibers Department is actively participating in these research programs.

To date, the improvements have been gradual, although comparison of today's felts with those of several years ago shows substantial increases in wear life, as well as resulting decreases in machine down-time and felt costs per ton of paper produced. Such evidence probably can be found by most papermakers in their own records.

Two synthetics, nylon and Dacron polyester fiber, are playing leading roles in the felt makers' efforts to produce the best possible felts. A high percentage of the felts made today contain one of these fibers in a blend with wool. Felt makers generally agree that felts capable of meeting requirements in the manufacture of papers made on modern high-speed machines could not be possible without nylon and Dacron.

Although use of these fibers has been limited to low percentage blends with wool, the results have been significant.

One board mill reports that felts of 50 per cent Dacron are lasting twice as long as all-wool felts used previously. A tissue mill's records show that felts of 30 per cent Dacron polyester fiber have increased felt life by 180 per cent, despite severe chemical conditions which rapidly degraded all-wool felts.

The wet felt in most common use today is a blend of 15 to 20 per cent nylon with wool. Throughout the industry, the experience has been that this small amount of nylon increases felt life an average of 20 to 25 per cent over all-wool felts.

Further improvements in sight

Even better things are yet to come. Whereas today's felts are essentially wool felts fortified by relatively small percentages of nylon or Dacron, technology is being developed for making felts with a higher percentage of synthetic fiber. This is being achieved through new manufacturing techniques and radically different constructions.

These are the properties expected of felts containing high percentages of nylon or Dacron:

1. *Improved felt life.* Both nylon and Dacron are far stronger and more highly resistant to abrasion than wool.

2. *Improved felt drainage.* Although Dacron and nylon fibers themselves absorb only minute amounts of water, felt structures made of these fibers are extremely wettable. High-percentage synthetic fiber felts should increase the rate of water transfer from sheet to felt and also require less nip pressures to remove that water from the felt structure. This can result in more efficient water removal, which will offer the papermaker substantial savings through lower steam costs on the dry end of the machine and through increased production rates.

3. *Resistance to chemical degradation.* Nylon is especially resistant to alkalis and Dacron polyester fiber is especially resistant to acid.

4. *Resistance to degradation by insects, bacteria, and microorganisms.* Synthetic fiber felts will offer no storage problems since nylon and Dacron are not attractive to moths and are not affected by bacteria or microorganisms.

The papermaker can hasten the day when felts with these important properties will become readily available.

Because every "wet" felt is custom engineered for each machine position, greatly improved felts can be produced only through a series of trials on commercial papermaking machinery.

The papermaker can be of greatest assistance to the felt maker by entering cooperative evaluation programs in which series of felts of various percentages of nylon and Dacron can be given commercial tests. The papermaker will find it to his advantage to encourage these programs, since he is the one who will benefit most.

Also of great importance to the felt maker is the conscientious reporting to him of any machine modifications which might affect felt performance. He cannot supply a felt which will perform well, unless he is fully aware of all the papermaker's felt requirements.

Finally, papermakers must keep accurate records of felt performance in order that the felt manufacturer may know what progress he is making.

The du Pont Co. is confident that nylon and Dacron polyester fiber will play an increasingly important role in felts for paper mills and is anxious to assist both the felt and paper manufacturers to utilize these fibers to their best advantage.

In addition to its work with "wet" felts, du Pont is experimenting with Darcon in dryer felts, with considerable indication that results will be favorable. Dacron is expected to contribute considerably longer life to dryer felts through resistance to degradation from heat, chemicals, water, and rot.

*A special contribution from E. I. du Pont de Nemours & Co.

New processes in pulp and paper

—a staff presentation

THERE ARE CONTINUOUS modifications of the pulp and paper making processes (some are described elsewhere in this issue), and work is continuing with the view to implementing such basic changes as (1) a more general application of continuous and improved pulping methods, (2) improvement of the dry-forming paper process announced earlier this year, and (3) research with the view to replacing steam with oil in the dryer rolls, which would eliminate condensate removal problems and high-pressure steam operations in paper drying, etc. These and a number of other developments, reported in 1955, may have considerable impact on the productivity in the industry.

New chlorine dioxide bleaching process

A new $3,500,000 kraft pulp bleaching process with an integrated slushing system is being installed at the Brown Co. mill in Berlin, N. H.

The chlorine dioxide is produced by the Day-Kesting Process, developed independently and simultaneously by Dr. George A. Day, director of research at the Brown Co., and Dr. Edelbert Kesting of Germany. This is the first commercial installation of this process in North America.

The process eliminates the need for procuring sodium chlorate. Sodium chloride is converted to sodium chlorate, which is then reacted with HCl to form chlorine dioxide and sodium chloride. The latter is then returned to the system to be reconverted to sodium chlorate. The initial capacity of the Brown Co. chlorine dioxide plant will be 1½ tons of chlorine dioxide per day.

Liquid chlorine batch dispensing system

In this method, developed by Central States Engineering Inc., chlorine is dispensed by weight without the use of conventional scales. A force cell is used as the weight determining element, and a dynolog recorder-controller is employed as the interpreting and scheduling device. This presents a convenient way of presetting the exact weight of chlorine to be delivered for a particular batch. Since all lines are always filled with liquid chlorine, corrosion is negligible, and the time lag associated with long lines is eliminated.

This method can also be applied to the metering of size, alum, liquid sulfur dioxide, etc., in batch systems. A system operating on this principle has recently been installed at the Neenah Paper Co., Neenah, Wis.

Use of the Deculator in deaerating coating color at the Provincial Paper Ltd., Georgetown, Ont.

A method of deaerating coating color

The Provincial Paper Ltd., Georgetown, Ont., has adapted the Deculator, manufactured by the Rotareaed Corp., for effective deaerating coating colors. The operation consists in spraying the coating color at a high velocity into a receiver kept under conditions of vacuum (absolute pressure in the receiver is about 0.8 in. Hg.).

This operation resulted in the removal of air as shown by (1) increase in the specific gravity of the coating color, (2) lowering of viscosity of the coating color, (3) absence of air bubbles from the coating color, and (4) complete disappearance of all evidence of foam and bubbles in the top box.

The effective use of the Deculator in this application was demonstrated by running freshly prepared coating color to the coating machine. Normally, under these conditions, this would mean having a layer of foam, 6-8 in. thick, in the bottom box; and foam would also be rising over the edge of the top box. With the Deculator in operation, there was no trace of foam or bubbles in the top box, and only a light blanket of foam was in evidence in the bottom box.

It was also shown that the use of the Deculator has no adverse effect on coating color formulations. Nor was there any evidence of coagulation (due to the high shearing action) of the styrene butadiene latex used in many formulations.

Chemical barking

A new invention (by C. H. Iffrig) promises to eliminate the need for girdling the tree prior to the application of the debarking chemical.

The new method (patent pending) consists of shooting the poison into the tree. A specially designed gun is held against the tree and, when fired, the projectile punches a hole in the bark, allowing the poison charge and expanding gasses to enter. The explosion force lifts the bark and distributes the poison over an area of about 2 sq. ft. or more, it is claimed.

An electrostatic process for applying dry coatings on paper*

R. B. REIF

A NEW METHOD has been developed at Battelle Memorial Institute, Columbus, Ohio, for coating paper with a dry coating applied by means of electrostatic forces. The principle used in the process is basically the same as used in an electrostatic precipitator. The coating material, suspended as a dust cloud in air, is charged electrically and deposited on the web with strong electrostatic fields. Charging of the air-borne coating powder is done with unipolar corona discharge.

The coating unit consists essentially of a closed system for generating and circulating a cloud of coating powder and a means for electrically charging and depositing the coating powder on the paper web in the coating chamber. Coatings from 3 to 20 lb., basis 25 by 38-500, have been deposited on webs moving at rates up to 100 fpm. After the coating is deposited on the paper and leaves the coating unit, it is fixed to the paper with heat.

The coating applied by the electrostatic process usually consists of pigments and a heat-sensitive resinous binder. A wide variety of colored coatings can be made by mixing commercial, colored pigments with the binder materials, and many properties can be obtained in the coatings using different resins in the binders. By this process, paper can be coated with mica, flock, and metallic pigments. Carbon paper and wax paper can be prepared also.

Before use, coating materials are ground to an average particle size of from 5 to 10 microns. Coatings with more than 50 per cent pigment are made by processing the coating materials in a special blending technique.

A major advantage of this process is its adaptability to different types of coatings in a variety of colors. The versatility of the process recommends it for small job work and specialty coatings as well as for making unique products in web form.

*Work on this process was sponsored by the Bergstrom Paper Co., Neenah, Wis.

Trends in power generation

H. C. SWANNEL*

THE TREND IS toward higher pressure for steam used in drying processes. The traditional 50 psig is being increased 30 to 50 per cent.

Turbine throttle steam conditions of higher pressure and higher temperature are being used, such as 1200 psig and 850°F. total temperature. This can be successfully accomplished now since the manufacturers of recovery boilers will offer equipment for these conditions, whereas heretofore the top limit was 850 psig and 850°F. total temperature.

Due to the higher throttle steam conditions, several expansion programs included "topping turbines", of the multiple automatic extraction type, wherein one of the extraction pressures is that of the original plant main steam pressure.

Precipitators

Electrostatic type precipitators now appear to be a "must" for all recovery boiler installations and designed as multi-cell units. This type of design will allow one cell to be taken out of operation for maintenance without necessity for shutting down the recovery boiler.

Feedwater temperature

Higher feedwater temperatures are being obtained through the use of heat exchangers operated from the various extraction steam pressures.

Bark burning boilers

Supplementary fuel is being fired with bark to obtain greater steam production and to substitute for bark during the hours the wood room is not in operation. This tends to eliminate bark storage formerly required to compensate for the periods of wood room shut downs.

*Head of power and steam department, J. E. Sirrine Co.

Electrical generation

GEORGE R. MORGAN*

PROBABLY THE MOST outstanding development electrically is the increase in electric generating capacity. Units of larger and larger capacity are being utilized which, in turn, have compelled the design of distribution systems of the 15,000-volt class. To keep pace with the increase in generating capacity, 15-kv metal clad switchgear having a short circuit rating of 60,000 momentary amperes and 750,000-kva interrupting capacity has been developed and is available.

Systems of this voltage require a more extensive use of unit substations for transformation to the lower utilization voltages. Wiring materials and methods are changing. High voltage (15-kv) distribution consists of 3-conductor 15-kv insulated interlocked armor cables placed in ladder-like racks or troughs instead of conduit installation; and this same development is being extended for circuits of lower voltage.

Centralized motor control to correspond to process control with remote control devices mounted on the instrument panels is more widely used. The control circuits heretofore have generally been installed in conduit, but there appears to be a trend to follow the practice of some European countries and Canada to use magnesium insulated conductors with metal sheath for reduction of space requirements.

*Head of electrical department, J. E. Sirrine Co.

Process piping, instrumentation

ROLAND L. ALLEN Jr.*

PROBABLY NO OTHER process industry offers a larger variety of problems for the piping design to solve than those encountered in the pulp and paper industry. Only a few years ago, piping design was seriously limited by the relatively meager selection of materials available. Many problems could be worked out in only a makeshift manner at best. There were practically no complete groups of pipe, fittings, valves, specialties, etc., other than carbon steel and copper or brass.

Today, the market is flooded with a tremendous variety of materials and components which offer satisfactory solutions to most of the problems The stainless steels and plastics are available in pipe, fittings, and valves; and more alloys and plastics are being developed constantly.

The piping designer of today still has his problems, however, and it is becoming increasingly difficult for him to keep abreast of the latest developments and differentiate between sound and promotional claims for the new products. A large proportion of the products on the market today have not been proven.

Today's biggest problem is the increasing possibility of misapplication of materials. Each material available has limitations. The range of some is broad, while others are limited to a narrow range of conditions. Since most of the new materials are relatively expensive, a misapplication can be costly. To counter this, the piping designer has a much greater opportunity to obtain up-to-date service information since there has been a tremendous volume of pulp and paper industry construction in the last few years using modern materials of construction. At no other time has such reliable information been available in such volume.

The source of this reliable information is the pulp and paper industry, not necessarily the material manufacturer.

Instrumentation

Like every other process industry, the pulp and paper industry is following the trend toward automation. The advantages obtained are numerous. New mills rely heavily on instruments to augment their experienced personnel during the initial production and operator training stages, and to reduce the manpower required. Old mills find that they can raise their production and efficiency by the addition of automatic process control.

All mills find that instrumentation tends to raise the quality and uniformity of their products.

Instrumentation finds its most spectacular place in a continuous process. By placing each process variable under constant automatic control, the process is made automatic, with raw materials being constantly fed into the process and a high quality uniform product delivered continuously at the desired rate.

The high production rates, high yields, products improved in quality and uniformity, and many of the new processes are all made possible in part by instrumentation. These reflect improvements in basis weight control, moisture control, etc.

Instrumentation of a process affords the means of recording production data and supplies a means of reproducing a given set of conditions at any desired time.

The pulp and paper industry is relatively a newcomer to automation, but is probably advancing along this line faster than any other industry. Most of the instruments used to date in the pulp and paper industry were developed for general use in other industries and have been applied to pulp and paper processes. In general, they have given satisfactory service but the future will probably bring more instruments developed specifically for the pulp and paper industry.

*Piping engineer, J. E. Sirrine Co.

Water treatment, pollution and odor problems

R. R. ADAMS*

THE TENDENCY in the design of modern water treatment plants for clarification and cold lime softening has been to use circular flow clarifiers combined with sludge contact reactors. A number of manufacturers have gone into this field and the purchaser has a fairly wide choice of designs. Recently-designed plants have incorporated more automatic control equipment than has been the practice in the past. These are calculated to reduce the amount of attention required to maintain the quality of the effluent from the treating plant.

In view of improvements that have been made in the design and operation of clarifier units, the filtration part of the water treatment plant has been uprated to as high as 3 gpm per square foot of filter surface and even higher rates. Our practice has been to design industrial filters of the open gravity type on the basis of 2½ gpm per square foot. Each specific project, however, requires study in order to provide the most economical design for the particular water being treated.

Pollution and odor abatement

One of the principal problems in locating new pulp and paper mills is the disposal of objectionable organic wastes and the reduction of odors caused from sulfur compounds used in pulping.

The most satisfactory means of disposal of waste, based on our experience, has been to provide for the removal of settleable solids by means of a primary clarifier and disposal of the sludge to a permanent location where it can be dried or stored indefinitely, while retaining the clarified effluent in a lagoon of sufficient capacity and controlling the discharge to obtain uniform dilution into the receiving stream. If dilution ratios for ordinary kraft pulp and paper mill wastes can be maintained so that the resulting color in the receiving stream after uniform diffusion is about 30 ppm, as measured by the APHA standard method, then in our opinion the results will be entirely satisfactory.

Some work has been done on air pollution abatement by the use of masking materials which reduce the objectionable quality of the odor. This means of reducing odor has not had very wide acceptance due to the cost, which may run from 20 to 40 cents per ton of product. However, a wider use of this material and improvement in the manufacturing process may reduce this cost in the future.

*Head of industrial process department, J. E. Sirrine Co.

Buildings and structures

JOHN H. BRINGHURST Jr.*

PULP AND PAPER mill structures, being basically functional in concept, require careful consideration for economical design with particular reference to the following:

1. Minimizing vibration due to ever increasing speeds of mechanical equipment, as well as vibrating or oscillating equipment operation.

2. Proper provision for pipe and conduit installation, together with access for servicing and removing equipment.

3. The use of color dynamics and, where feasible, acoustical treatment, together with provision for ventilation and air conditioning to provide generally better working conditions and facilities.

4. Provisions for centralized locker rooms, cafeterias, research buildings, supervisory offices, etc., with attractive architectural treatment, usually of multi-colored tile interiors and masonry exteriors.

The general tendency in the mill structures themselves is essentially windowless construction with fully controlled ventilation and only sufficient view panels for the psychological value on operating personnel.

Aside from permanent masonry walls of either common or jumbo brick, or speed-tile, many of the newer insulated sandwich type panels, together with translucent plastics, are coming into use where humidity conditions permit, and more particularly where removal of walls is necessary due to future expansion. Extruded aluminum for sash, louvers, and cornice trim, contrary to former belief, is now being found to stand up well in the face of corrosive vapors.

*Building department, J. E. Sirrine Co.

Construction methods

K. G. TAYLOR*

THE RAPID DEVELOPMENT of the pulp and paper industry in the United States during the last decade has, in itself, dictated an advance in construction methods which has been evident in mills going into operation this past year.

Prior commitments made by the pulp and paper manufacturers during the planning stages of their jobs have resulted in tight construction schedules that can be executed on a realistic basis. Design work is set up to meet the sequence of construction operations and work parcelled out for bids progressively to attain earlier starts on new work.

Contractors are continuously developing methods of construction to gain valuable job time and clear the way for subsequent contractors. A few of the outstanding improvements in these methods may be itemized:

1. Where piling is required for foundations and conditions warrant, a site preparation contractor moves onto the project ahead of the piling contractor to grade the areas to approximate pile cut-off elevation, which in turn results in a faster rate of driving piles.

2. Larger concrete batch plants, often operated under separate contract, are being set up with hauling done by greater capacity transit mix trucks delivering concrete at a more rapid sustained rate of pouring.

3. The use of high tensile strength bolts instead of rivets for structural steel is cutting down the required erection time and utilizing more available workmen for the job of connecting up steel; not to mention the improvement attained in the structural connections throughout the building by use of this type bolt.

4. Improvements in construction equipment consisting of greater capacity and speedier earth moving equipment, the use of one-man triple tamps to replace the single tamp, more mobile and larger capacity equipment handling rigs and lightweight scaffolding easier to assemble and disassemble, all contribute to a stepped-up rate of construction.

*Construction engineer, J. E. Sirrine Co.

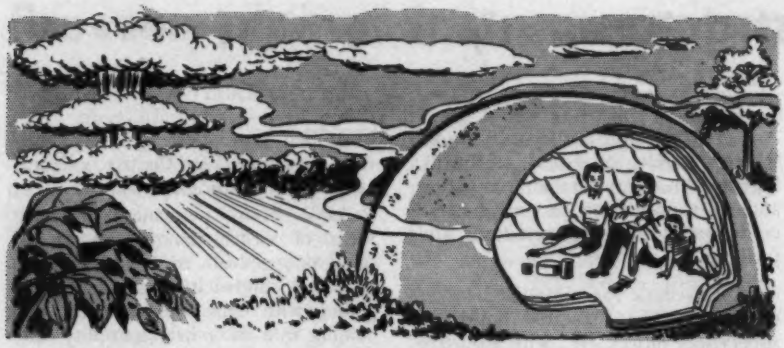
New products and applications

—a staff presentation

WHILE CHEMICAL RESEARCH continues and, as visualized by some, will eventually give the pulp and paper industry (1) a solvent for lignin removal from the cellulose fibers, (2) reagents to react in water with cellulose hydroxyls at dilute concentrations and thereby drastically modify cellulose fiber properties, and (3) additives that will spectacularly increase the strength of paper now limited by the strength of the fiber-fiber bonds, there are research projects now underway that should lead in the near future to many more new paper products and applications.

Not too far in the future may be the effective incorporation of a rodent repellent in paper bags to clear the way for the extensive use of paper multiwall bags in food storage.

Current research in food preservation through irradiation with radioactive materials is very likely to open a vast new demand for paper in food packaging. The problem not yet solved is to develop a fibrous package that will withstand the necessary radiation and, at the same time,



Shelters made of diffusion board can provide protection from atomic dust, poison gas, and germ warfare

protect the food from spoilage and contamination. Food irradiation has presented the chemists with an entirely new set of problems from that of heat sterilization. In the former, a variety of types of free radicals are knocked off from the molecular constituents of the food. These free radicals are very active and, if present in sufficient quantities, may change the chemistry of the irradiated food or may even react with the container.

Of great importance will be the development of a dimensional stabilizer for cellulose fiber to counteract the expansion and contraction of paper under the influence of humidity and moisture, which is a nuisance to both papermaking and paper user.

Among the more important new products or applications developed or established in 1955 are the following:

Latex impregnated book paper

Sorg Paper Co. has developed latex-impregnated coated book paper sold under the trade name TENSALEX. Reinhold Publishing Corp. used this type of paper for the first time this year in one of its books, and the observation was made that half-tones printed on this paper can readily be reproduced by offset press, the reproductions being practically indistinguishable from the originals.

Sorg Paper has another new product on the market, the 4-10 Translucent paper, which will be required in tonnage volume for reproducing engineering drawings and railroad way-bills by the Diazo reproduction process.

Diffusion board

The development of a wood fiber building board that filters radioactive fallout, poison gasses, and germ-carrying particles from the atmosphere has just been announced by the U. S. Forest Products Research Laboratory, Madison, Wis.

This fiberboard, known as "Diffusion Board," is designed for building shelters that will protect troops and civilians from some of the most deadly effects of modern war. The board contains special chemicals that screen out deadly gasses and particles. It is sufficiently porous to permit passage of life-sustaining oxygen into the shelters as well as the escape of carbon dioxide from the shelters. The board can be manufactured with practically the same equipment used in making ordinary building fiberboard, and any species of wood can be pulped for this purpose.

According to Dr. Alfred J. Stamm, under whose direction the "Diffusion Board" was developed, troops and the general public can have effective protection from atomic dust, poison gas, and germ warfare in these shelters.

Tall oil

The use of tall oil in the paint industry has been greatly extended, and new uses have been found in the fields of asphalt emulsification, insecticides, disinfectants, and iron-ore flotation.

Ground-bark

Battelle research men have shown that wood bark can be made into an effective garden mulch. A ground-bark mulch is now being marketed by a large holder of forest reserves.

Paper pallets

A pallet made of paper, known as the "Accopak Pallet", has been developed by American Cyanamid Co. It is essentially a paper sling attached to paperboard tubes at each side, onto which fit the forks of a lift truck.

These paper pallets are designed to reduce the cost of handling products packed in bags. Stacked loads may be picked up, stored, or shipped without removing the pallets.

The pallets are made of wet strength paper, are low in cost, weigh only three pounds, and take up only a fraction of the space used by conventional pallets.

In shipping they can save almost a ton of weight per freight car with the corresponding savings in shipping costs.

Paper pallets are low in cost, light in weight, and take up only a fraction of the space used by conventional pallets

Insulite roof deck

This product, developed by the Minnesota & Ontario Paper Co. in 1954, has found wide acceptance in the construction industry in 1955. In fact, the demand for Insulite roof deck is far exceeding the current supply.

The product is basically an insulation board laminated together to the desired thicknesses (1½, 2 and 3 in.) with a water-proofed adhesive. One side is laminated to a Graylite base, which is asphalt-impregnated and provides a white, flame resistant, finished textured surface. It also absorbs noise and makes an attractive predecorated ceiling.

Each slab (2 ft. wide and 8 ft. long), if used in cold climates, has a vapor barrier membrane built into it and a special resilient gasket in the square tongue and groove joint to seal against vapor leakage at this point.

Insulite roof deck provides more than twice the insulation value of wood alone. A 2-in. thick deck, for instance, is equivalent to 2 in. of wood deck plus 1 in. of fiberboard insulation.

Insulite shingle-backer

Another product recently developed by Minnesota & Ontario which has found general acceptance and enjoyed great popularity this year is the Insulite shingle-backer used as undercoursing for wood shingles.

The shingle-backer is specially designed for use over sheating as a backing for an exterior wall finish of wood shingles with wide exposure. The exterior effect of such construction is that of a double-coursed wood shingle wall finish.

Shingle backer is used as a backing for an exterior wall finish of wood shingles with wide exposure

Honeycomb

Increased demands and new uses for honeycomb have been in evidence during the year. The application of honeycomb has been extended considerably in the field of packaging, and ½- to 4-in. thicknesses of honeycomb are now used for shipping delicate instruments, fragile materials, blood plasma bottles, expensive books, steel panels, etc.

Among the new uses for honeycomb are (1) the use of crushed honeycomb (which has great resilience) to absorb the impact of parrachuted equipment, and (2) the use of honeycomb in the construction of guided missiles, aircraft, and in various marine applications.

Paper from synthetic fibers

Since the announcement by duPont in February, 1955, that paper has been produced successfully from synthetic fibers (such as nylon, dacron polyester, and orlon acrylic fiber), the first commercial run of nylon fiber paper was announced by Riegel Paper Corp. on August 8.

Papers made from synthetic fibers have such important properties as (1) resistance to chemical attack, which makes them useful in filtration of corrosive liquids and in packaging of chemicals, (2) stability to moisture, which is important in map tracing papers, records and documents where permanence is essential, and (3) in-

(Continued on page 587)

Insulite roof deck is being applied directly over beams which are left exposed. On the right is a cross section showing the resilient rubber gasket seal, vapor barrier membrane, and finished interior surface

New equipment, materials, and performance

THE PREDOMINANT note in 1955 is that of upgrading of products. The general endeavor to excel quality-wise seems to prevail despite exceedingly favorable market conditions that present no major problems of finding customers for the industry's output. The more competitive nature of the 1954 market has left its mark, and the drive is being maintained to produce at the highest quality level. This is done in the realization that the customer's good will must be cultivated as a safeguard for a possible recurrence of less favorable market conditions.

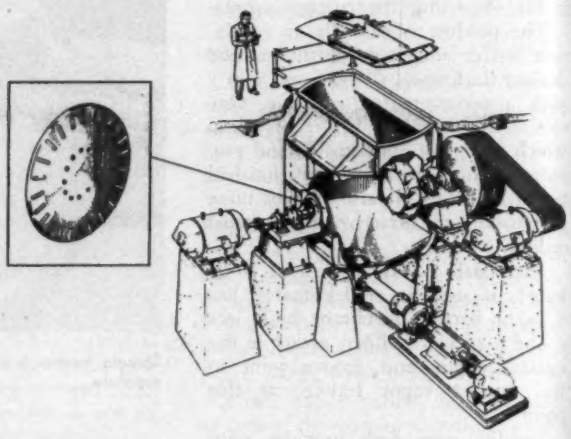
The same far-sighted appraisal is also noticeable in the industry's attitude toward the export market. The high productivity of the North American pulp and paper industry has given it a competitive advantage on the world market. While this has come as somewhat of a surpirse to many mills, the ice has been broken and there seems to be a keen determination to keep and cultivate this market despite the fact that the present desire to raise inventories and the general strong activity on the home market could easily absorb the pulp and paper industry's capacity output.

A major share of credit for the high level of productivity and quality of output of the pulp and paper industry is, of course, due to the excellence and high performance of the equipment used. The following selection will show some of the new equipment and materials that are being made available to the industry in 1955 and some of the new heights of performance or application that have been reached.

Continuous digester

Recent developments in the continuous cooking process by Pandia (div. of Black-Clawson) engineers include controlled progress of the cooking mass, elimination of pocketing, continuous purge of non-condensables, rapid impregnation, recirculation and refortification, vapor phase cooking, continuous flowing, higher pressures and temperatures, and more rapid cooking time.

These developments have made the Pandia continuous digester a highly effective producer of unbleached and bleachable kraft pulps of uniform quality. The unit can be used effectively on all hardwoods, straw, cotton linters, bagasse, saw dust, shavings and other wood wastes.



View of E. D. Jones' Hi-Lo pulper with larger slow-turning impellor and high-speed rotor

A Pandia continuous cooker was chosen for the first Peadco process pulping unit of the W. R. Grace & Co. bagasse pulp and paper mills at Taramonga, Peru. A measure of the successful operation of this equipment is the announcement by Grace that an adidtional 115-ton Peadco plant, using continuous digestion, is scheduled for construction in 1956.

The Jones Hi-Lo pulper

E. D. Jones & Sons Co. has developed the Jones Hi-Lo pulper, which is available in standard sizes ranging from 500 to 8000 lbs. batch capacity.

The cutaway drawing shows the general arrangement of a batch-type Hi-Lo pulper. On the right of the tank is located a very large, slow-turning, heavy-bladed impeller. This impeller is designed to give initial break-up of the material to be pulped and to produce extremely vigorous circulation of the pulp mass at high consistencies and with very low power expenditure. On the left side of the tank is located the high-speed rotor. The rotor is directly connected to a standard motor of conventional speeds (690 to 860 rpm). The high-speed rotor is a plain disc, on the working face of which are located numerous inserts of cemented tungsten carbide. These inserts project approximately ⅛ in. above the surface of the high-speed rotor. The tungsten carbide blades of the rotor hit the pulp mass at an extremely high rate and speed and in this manner efficiently defiber the material whether it is pulp, broke, or even wet strength paper.

With the combination of the high and low speed rotors, this pulper is both extremely efficient and flexible. In some cases where a very easy slushing material is to be broken down, the pulper may be run with only the low-speed rotor turning. Should it be necessary to defiber Kamyr pressed pulp or heavy sized broke or wet strength materials, then the high-speed rotor comes into action and produces very rapid breakdown with complete fiber separation.

Duopulper

Successful application of the hydrapulper to broke handling problems over the past 15 years and continued extensive studies of broke handling problems by Black-Clawson specialists has led to the development of the new Duopulper. This piece of equipment is a double pulper with two hydrapulper rotors operating in an elongated or oval-shaped tub. The shape of the tub permits installation directly beneath the dry end of the machine where headroom is generally an important factor. It also permits the pulp to receive the full width of the sheet coming out of the machine. Application of the double rotors assures high capacity through quick and efficient repulping of all machine broke as quickly as it is made.

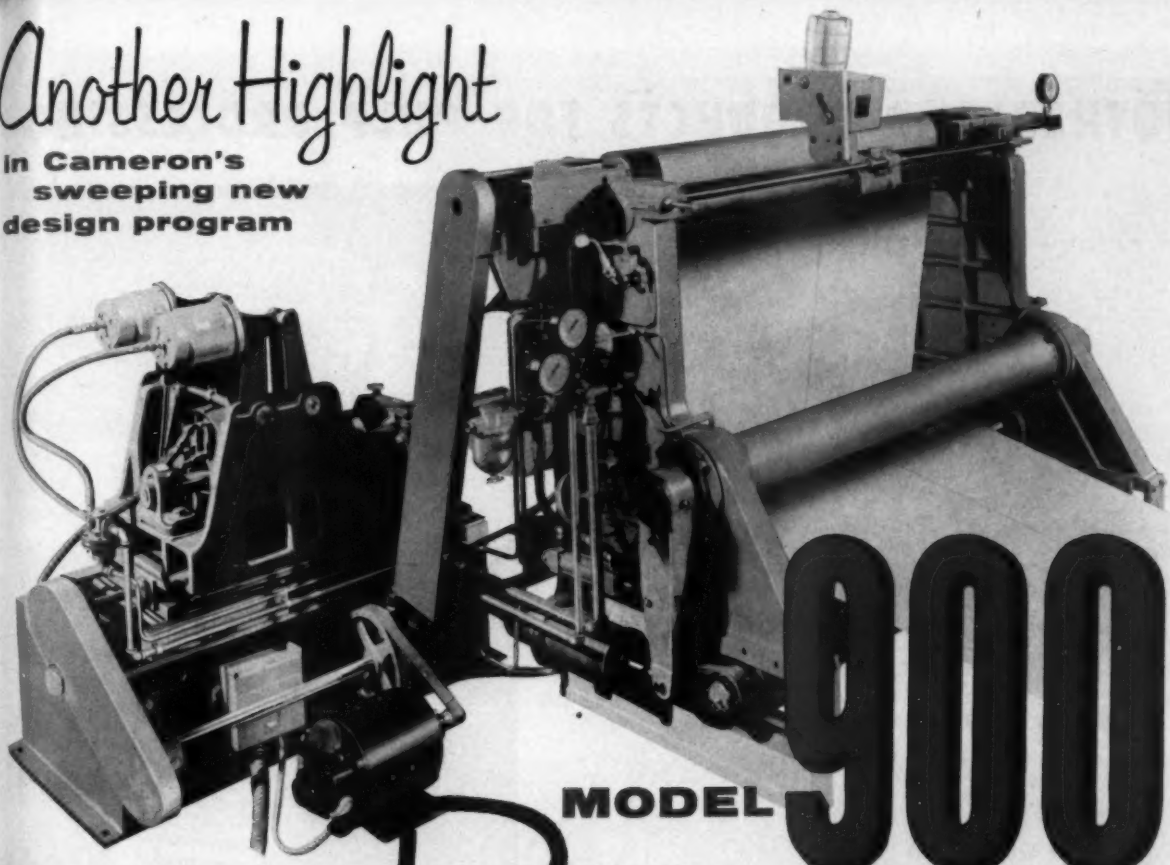
Liquid cyclone

This new high-velocity stock cleaning unit, developed by Black-Clawson, incorporates the principle of free vortex for separating both heavy and fine particles of foreign matter from papermaking stock.

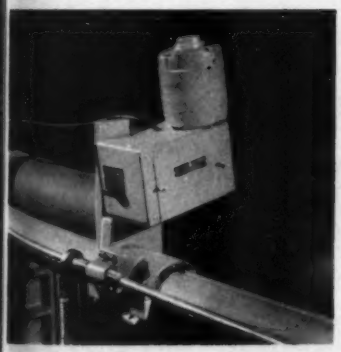
The liquid cyclone is installed immediately following primary pulping equipment, handles 1000 gpm, and

Another Highlight

In Cameron's sweeping new design program

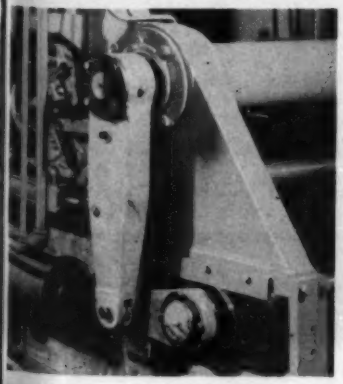


MODEL 900 Pneumatic Tension



ABOVE: The automatic photo-electric side register control features an anti-backlash, friction free traversing of scanner roll for optimum accuracy and speed of response.

BELOW: The cam-controlled pneumatic pressure tensioning system provides extreme sensitivity in tension control.



THE NEW MODEL 900 pneumatic tension with automatic photo-electric side register control makes it easy to produce better finished rolls of all types of plain or printed materials. In one unit it provides automatic unwind tension control and electronic edge guiding, printed line guiding and printed pattern guiding.

SENSITIVE CONTROL. Extraordinary range and sensitivity of the new 900 permits handling a wide variety of materials, including stretchy plastic films such as polyethylene, vinyl and cellulose acetate; various grades of lightweight paper; and board. The low inertia, low friction tension roll provides automatic slack take-up and cushioning to reduce snap-offs and to maintain constant web control despite parent roll irregularities. The cam-controlled pneumatic pressure tensioning system is infinitely variable from zero to maximum. It is arranged for full stroke dancer roll travel regardless of tension setting. Versatility is apparent in the range of total controlled web tension . . . 200 to 1, or from 5 pounds distributed across the entire web to 1000 pounds.

ACCURATE REGISTER. The newly developed side register control operates instantly and accurately, whether guiding to a printed line or to the edge of the web. Its rate of response and correction is unmatched. On the standard unit the rate of correction is 60″ per minute with an accuracy of plus or minus 1/64″. The 900, with this control, is being used for high speed production of saleable rolls without trimming, and for hair line guiding on printed materials. A special unit of equal accuracy can be furnished with a correction rate of 120″ per minute.

FLEXIBLE. The double-disc, air-operated, water-cooled J-brake on the new 900 meets requirements for running light materials and yet is rugged enough for prolonged runs on heavier materials.

THE 900 is built to handle web widths from 42″ to 92″ and parent rolls of either 42″ or 60″ diameter. Built with sturdy one-piece side frames. Anti-friction bearings used throughout. The tension control alone, without the side register control mechanism, is also available.

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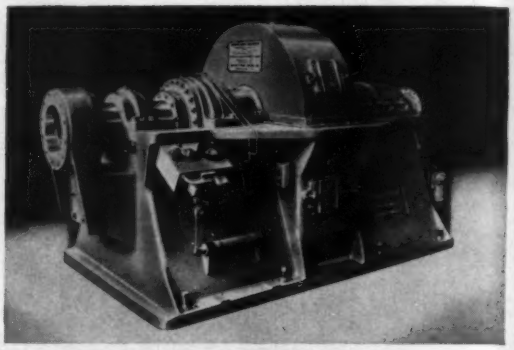
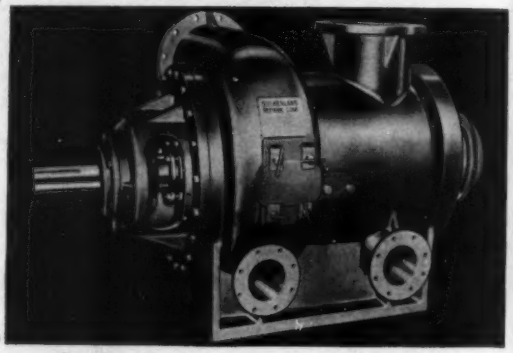
SUTHERLAND REFINER

Experience gained in the operation of more than 500 Sutherland refiners is available to help you solve your refiner problems.



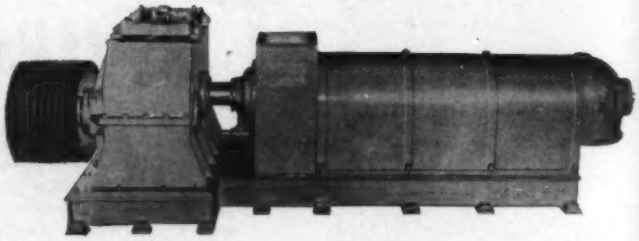
SUTHERLAND BREAKER TRAP

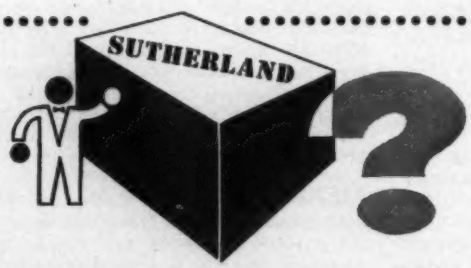
The only machine specifically designed for the selective defibering of paper pulp.



SUTHERLAND PRESSURE WASHING SYSTEM

Higher operating efficiency is accomplished with specially designed presses—a real advance in the washing field.





SUTHERLAND RESEARCH
soon will have something new for you.
WATCH FOR IT.

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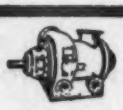
REFINER CORPORATION
TRENTON 8, NEW JERSEY



MANUFACTURED BY VALLEY IRON WORKS CO., APPLETON, WISCONSIN

employs the prinicple of no bleed-off to minimize stock loss.

This equipment has successfully passed pilot plant tests and also field tests under actual mill operating conditions.

The Sutherland breaker trap

While Sutherland Refiner Corp. completed its 500th disc refiner in May, 1955, the new stainless steel breaker trap, available in both the 12-in. and the 18-in., models, has recently been introduced for corrosive installations such as sulfite.

The breaker trap is finding application in a number of important operations in pulp mills and paper mills, such as (1) defibering waste paper, (2) mixing kraft wastes with virgin pulp, (3) removing tramp metal, (4) separating dirt, knots, shives, etc., (5) defibering high-yield sulfite and high-yield sulfate pulps, and (6) defibering broke.

It further removes large particles of magnetic and non-magnetic tramp metal by centrifugal action, but retains other waste material such as large dirt particles, cellophane, etc., which are removed by standard screening methods.

The efficiency of the breaker trap lies in the high degree of controlled turbulence that takes place within the working area, causing the pulp to work against itself. Power consumption is low. The 18-in. breaker trap usually requires between 50 and 200 hp.

Proved performance of E. D. Jones double disc refiners

This year has brought complete endorsement by the paper industry of E. D. Jones double disc refiners, the first of which went into operation in October, 1953.

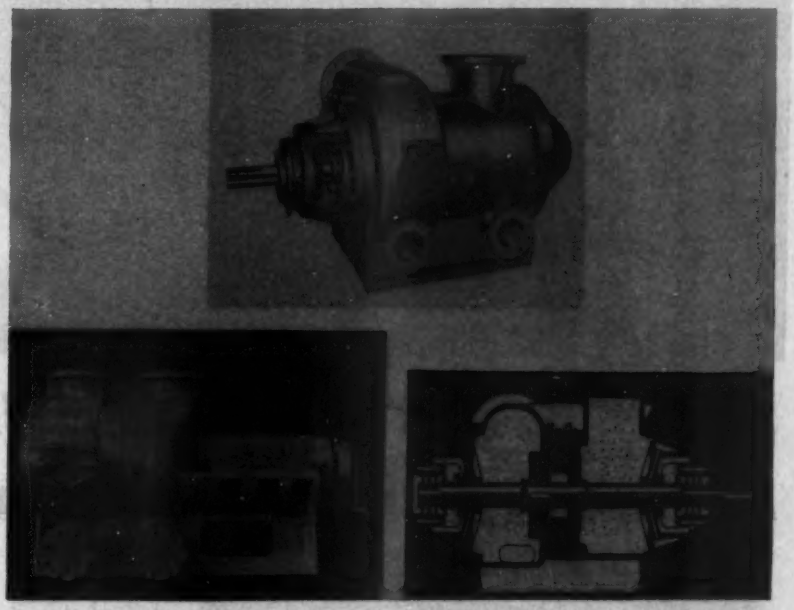
To date, 12 prominent companies have installed or ordered double disc refiners, with eight of these companies having installed or ordered multiple installations. These refiners, known as "Double D's", are available in three sizes, with disc diameters measuring 26, 34, and 42 in., respectively. Power requirements range from 200 hp for the 26-in. size to 700 hp. for the 42-in. unit.

An improved guar gum

Burtonite No. 7, a water soluble gum derived from guar seeds, imparts colloidal characteristics to the fiber similar to those provided by mechanical refining, it is claimed. While mechanical refining is still required, the addition of 0.5 - 1 per cent of Burtonite No. 7 on dry fiber weight reduces refining time about 52 per cent, facilitates formation on the wire, and permits the use of higher percentages of short fibered pulps.

The paper produced with the use of Burtonite No. 7 is said to have high porosity, more fold endurance, less tendency to curl, and no two-sidedness when pigmented.

Sutherland's 500th refiner is inspected by Lionel Sutherland (l), president of Sutherland Refiner Corp., and R. A. Peterson, president of Valley Iron Works Co.



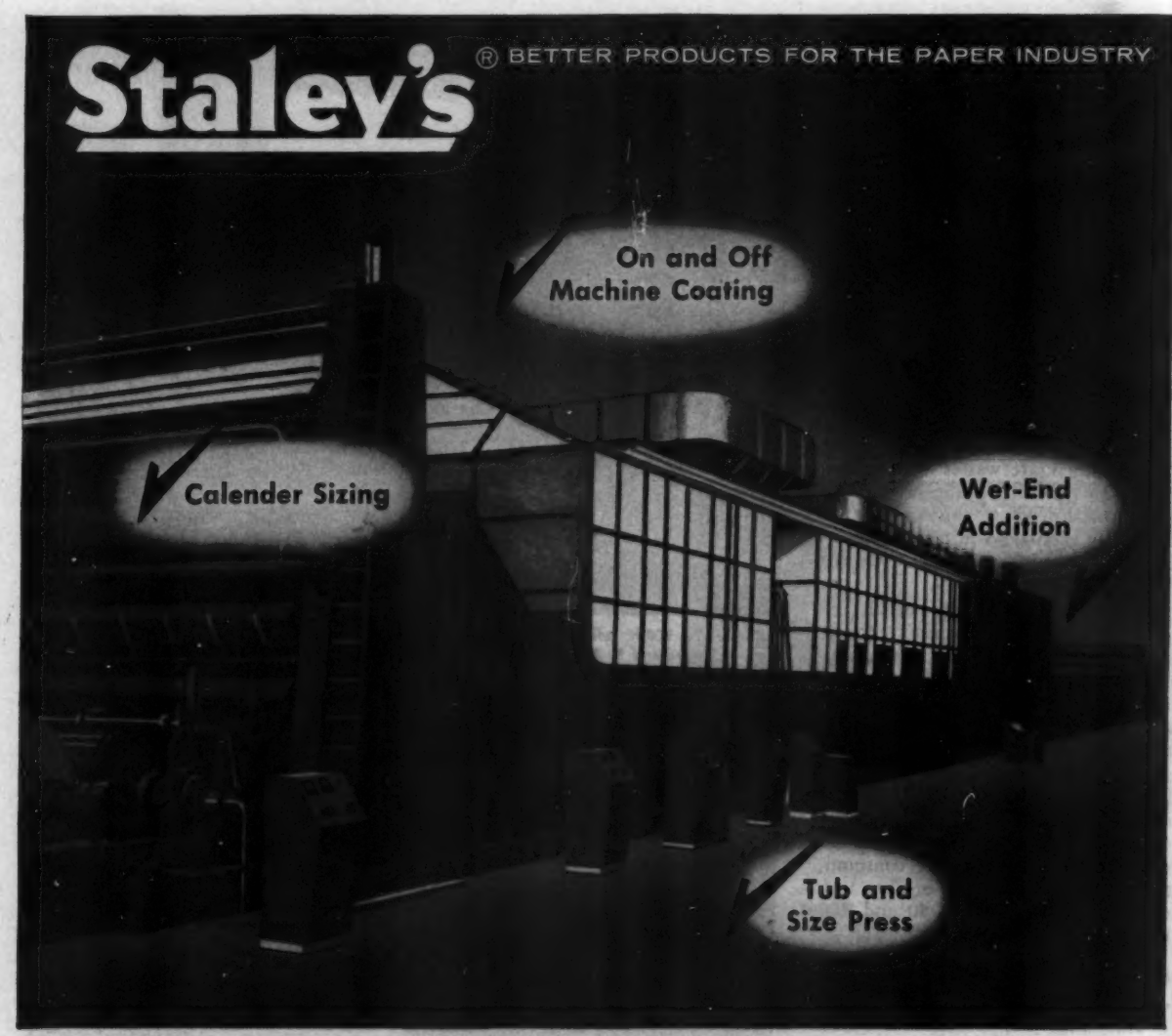
12- and 18-in. breaker traps provide a wide range of capacities for many different jobs. Cutaway of the 18-in. model shows how the unit operates

New selectifier screens

New developments in selectifier screen design and application in the past years has produced a new model, the 24-P Selectifier made by Shartle Bros. Machine Div. of the Black-Clawson Co. This totally-enclosed machine screen features new airfoil design rotating element and is applicable to practically all grades of paper being made, with particular emphasis on fine grades, tissue grades, and newsprint.

The selectifiers increase machine production by effecting a more constant production rate and reducing the number of sheet breaks caused by such undesirable materials as stock lumps, slime slugs, and other foreign

Staley's ® BETTER PRODUCTS FOR THE PAPER INDUSTRY



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materials. With sheet breaks reduced, there is less unsaleable paper wound at the reel and less chance for damaged rolls and roll coverings which could cause shut-downs resulting in loss to machine production.

Valveless filter

Another comparatively new development in which several refinements have been added over the past year is the Black-Clawson valveless filter (formely Strindlund) which contains its own vacuum source in the form of built-in drainage tubes.

New refinements of the filter include means for better filtrate removal with adjustments to compensate for different types of stock and a completely automatic control system. The company is presently building four large units with drum diameters of 11¼ ft. by 11½ ft. face.

Brammer recording consistency control

The Brammer, made by Black-Clawson, has no moving parts, no maintenance problems, and is said to hold accurately stock consistencies to plus or minus 1/10th of 1 per cent. New developments in Brammer application provide for either a one-sample system, where only a portion of the unregulated stock is bled-off to the regulator, or a full-volume system, where the full flow of unregulated stock passes through the Brammer for full correction prior to passing to the next phase of treatment. In the case of regulated stock to the jordans, the Brammer recording consistency control forms an intergral part of the jordan distribution headbox.

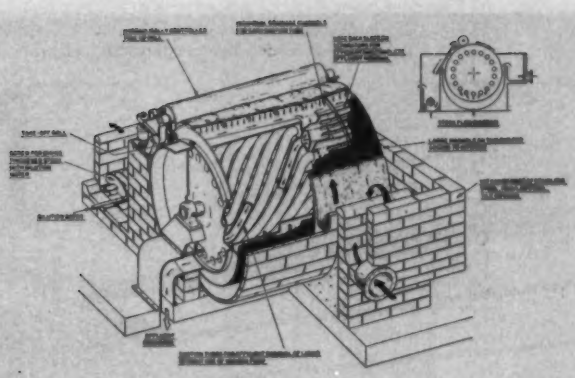
New vat developments

Recent vat developments made by Black-Clawson incorporate built-in Hydronamic inlets. Inlet orifices with adjustable lips extending the complete width of the vat assure efficient handling of a wide range of stocks at all machine speeds.

Vat ends have been improved with enlarged openings to permit quick evacuation of white water from the interior of the mold, as well as helping eliminate foam entrapment.

Complete new stock supply systems have been developed to eliminate air entrapment in the stock, while totally enclosed systems utilizing the selectifier screens and deaerating chests further eliminate the entrainment of air into the vat system.

Another vat development includes built-in vat exhauster equipment with duct work and exhausting units located in the basement rather than at the operating area around the wet end.



Black-Clawson's new valveless filter, which contains its own vacuum source in the form of built-in drainage tubes

A soil retardant for paper

A chemical which can keep rugs, fabrics, paper, etc., clean and fresh looking, even when dirt is applied directly to them, has been demonstrated by du Pont Co.

"Ludox" colloidal silica does its work as a soil retardant by filling up the microscopically small pits and crevices, known as soil receptor sites, that all surfaces possess in varying degrees.

While the first commercial application of this anti-soil chemical has been made by the floor-covering industry, continuing du Pont research has disclosed the use of colloidal silica as a soil retardant on painted surfaces, wallpaper, window shades, venetian blinds, lamp shades, slip covers, upholstery, and draperies.

New corrugating adhesive

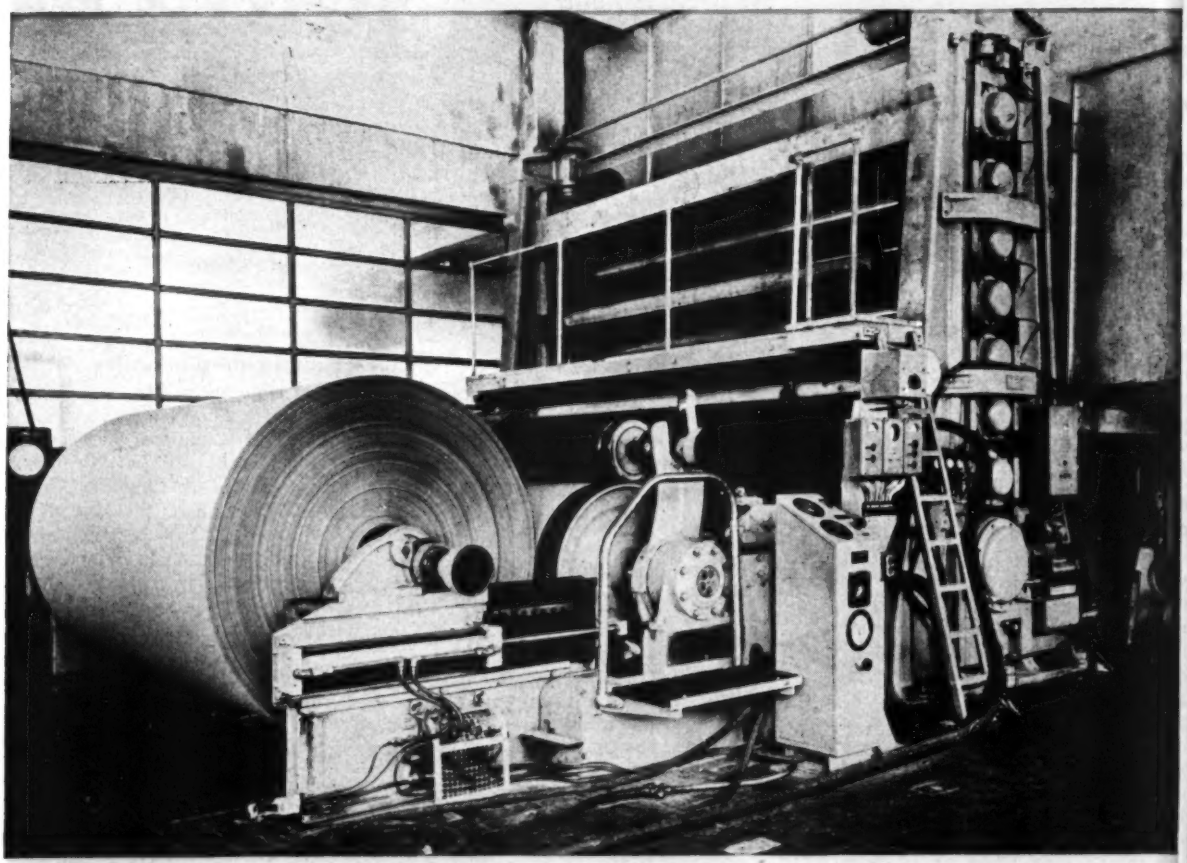
A new adhesive which will greatly increase the production of waterproof corrugated or laminated boxboard, paper tubes, and bags has been developed by Koopers Chemical Div., in conjunction with A. E. Staley Mfg. Co. and Penick & Ford. The adhesive is prepared by reacting resorcinol with formaldehyde in the presence of starch.

The acid nature of starch-urea formaldehyde pastes has not permitted the production of corrugated board at high speed. The new adhesive has been run in practical tests at speeds up to 400 fpm. The adhesive, according to Koppers, is also fast-curing and compatible with domestic starch pastes.

A. E. Staley Mfg. Co. is marketing the new adhesive under the name

A sample of wall paper, half of which has been treated with "Ludox" colloidal silica. The entire surface has been heavily soiled with ordinary house dirt sweepings, then wiped with a clean cloth. The treated half emerges fresh and clean, while the untreated half soils severely

Puseyjones Improved Type Pope Reel installed in Italian Kraft paper mill. Reel has horizontal track air-loaded nip pressure, 36" diameter Reel drum, 64" maximum diameter paper roll.



Italian Kraft Mill gets
fast installation . . . full satisfaction
with New Puseyjones Pope Reel

Paper mills throughout the United States have proved the ability of the new, improved type Puseyjones Reel to give uniform rolls . . . smooth winding . . . simplified reel changes.

Now this same outstanding Reel — installed in just 36 hours — is helping a prominent Italian mill to produce more Kraft paper . . . more easily . . . for better profits.

"We have pleasure to inform you," writes this transatlantic customer, "that your Pope Reel is now working to our complete satisfaction and the installation was made in a very short time. With your new Pope Reel, we have made perfect reels of Kraft paper."

Let Puseyjones engineers show you how the Improved Type Pope Reel can reduce down-time . . . give greater safety on reel changes . . . control tension . . . provide accurate roll-to-drum pressure. Write or call us today.

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Wilmington 99, Delaware, U.S.A.

of Staybine Waterproof Corrugating Starch No. 5030.

New polyethylene laminator at Rapinwax Paper Co.

The installation of a polyethylene extrusion laminator for locker wrap, foil, and cellophane was recently made at the Rapinwax Paper Co., Minneapolis, Minn.

The machine was engineered and furnished complete by the Black-Clawson Co. (Dilts Machine Works Div.). It features the Dilts Model 20 two-arm rotary unwinds and winds for continuous operation with flying starts.

The laminator is the Dilts Model TL-400 with the "cross heat transfer insert" for the cooling roll, a Hartig extruder, and Reliance drive.

A second unwind stand located overhead is provided for laminating two webs with polyethylene in the center.

New polyethylene laminator made by Dilts and installed at Rapinwax Paper Co.

A new coloring and laminating machine at Mengel Co.

A new 80-in. machine for over-all coloring, trademark and over-all pattern printing has been installed recently at the Corrugated Box Div. of Mengel Co., Fulton, N. Y. The machine, engineered by Black-Clawson Co. (Dilt Machine Works, Div.), is used on bleached and unbleached kraft liner for corrugated boxes.

Designed for 400 fpm maximum speed, the machine incorporates a Dilts Model PF Flexographic printing press for 7- to 9-in. diameter plate cylinder range. Auxiliary lead rollers and pressure roll are furnished for performing two-ply laminations. The press is completely air-actuated and furnished with agitation drive and pumping system.

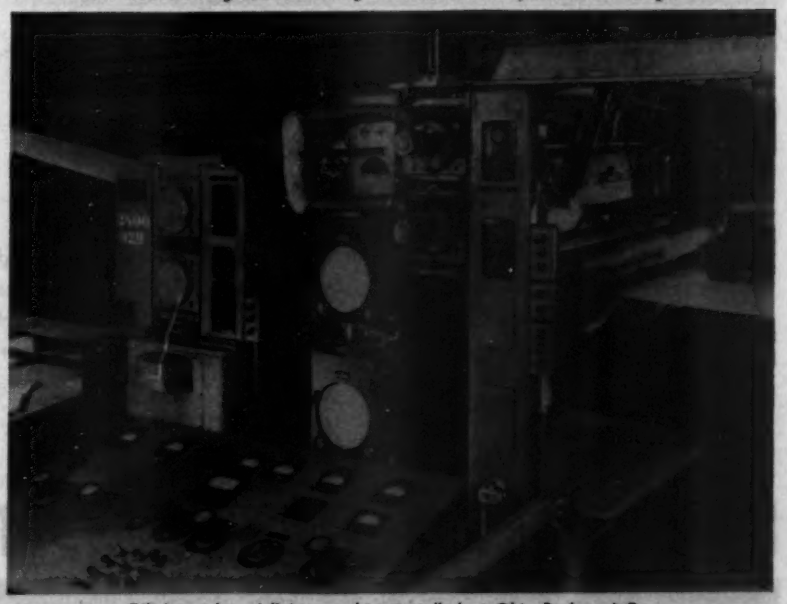
Dilts' new coloring and laminating machine now in operation at Mengel Co.

New board lining machines installed at Boxboard

A new high speed two-ply board lining machine has been installed at the Ohio Boxboard Co., Rittman, Ohio, for lining board with greaseproof papers and glassine. The machine handles web widths up to 72 in.

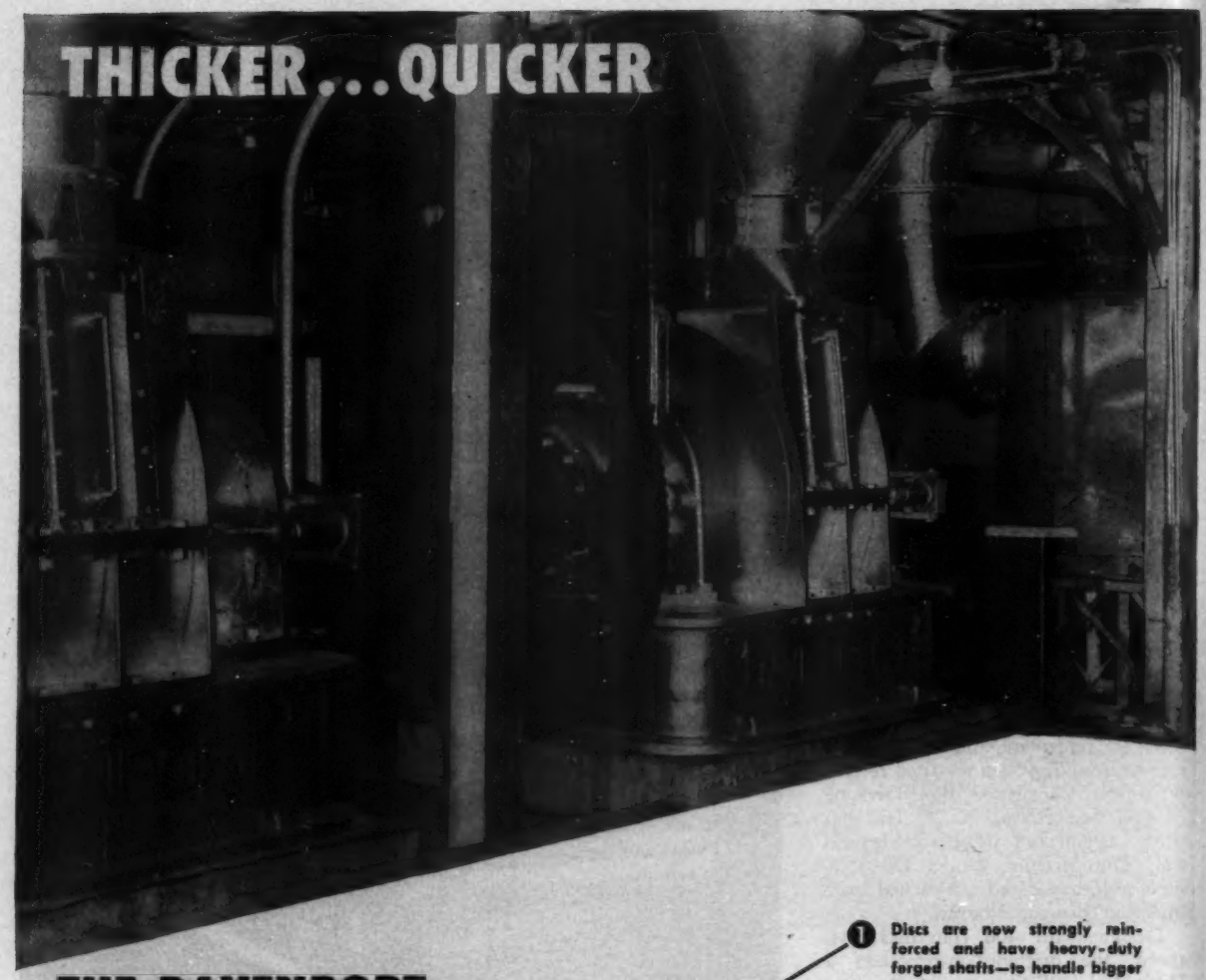
The machine, designed and built by Black-Clawson Co. (Dilts Machine Works Div.) in cooperation with the Ohio Boxboard engineering staff, includes two unwind stands, tension and spring rolls section, adhesive coating head, combining section, Hamblet cutter, and Maxson automatic layboy and stacker.

The coating station was designed to handle wax, starch, and dextrine adhesives by either nip, direct kiss, or reverse kiss methods of applications.



Dilts' new board lining machine installed at Ohio Boxboard Co.

THICKER...QUICKER



THE DAVENPORT CONTINUOUS PRESS HAS 3 IMPORTANT NEW FEATURES TO LOWER THE COST OF HIGH DENSITY STOCK

1. Discs are now strongly reinforced and have heavy-duty forged shafts—to handle bigger loads
2. The radial and thrust bearings are now totally enclosed and are not exposed to water from the press—for longer life
3. One disc bearing is pressure-loaded, permitting any coarse foreign material to go through the press without damaging it—saving down time.

Davenport Continuous Presses are built for heavy duty service. All parts in contact with the material are corrosion resistant. The design is simple, with few wearing parts. As a result, maintenance costs are extremely low. Power costs are also low.

Presses are made in 3 capacities to handle from 15 to 75 tons B.D. every 24hours. They are manufactured by Davenport Machine & Foundry Company and sold to Pulp and Paper manufacturers exclusively by American Defibrator, Inc. For further information, ask for bulletin.

AMERICAN DEFIBRATOR, INC. CHRYSLER BUILDING NEW YORK 17, N. Y.

In the kiss methods, the adhesive is picked up by the lower of the two rolls, metered through a precision-tapered wedge-controlled nip, then applied by top roll to the web. When the machine stops, adjustable wrap rolls preceding the application roll automatically raise the web from the applicator roll to prevent coating of the web. A heated smoothing bar follows coating application to further smooth coating film.

Following the coating station is the combining section at which point the two webs are joined. This section features two chrome-plated chilled iron rolls — top roll air loaded with individual pressure regulators for front side and drive side. From the combining section, the combined webs pass through the slitter and cutter to the layboy and stacker. Operating speeds up to 600 fpm have been obtained on this machine.

View of the Lamson revolving belt conveyor at the Brown Co. mill

Carton storage and loading conveying system. Each storage line has an automatic metering device to permit a desired number of cartons to be moved from each line

Carton storage and loading conveying system

A unique carton storage and loading conveying system has been installed at Brown Co. mill, Berlin, N. H., by Lamson Corp.

The cartons are conveyed on a single belt conveyor to a basement which houses a unique, revolving, inclined belt conveyor with a tail end section that can be adjusted to feed cartons from a single line from the sealing machine to a system of 16 gravity storage conveyors arranged in parallel lines, two tiers high. The incline belt conveyor device feeds any one storage-conveyor at a time.

The 16 storage conveyors converge into a single line that runs to the shipping dock. Each of the storage lines has an automatic metering device which permits a dispatcher to preset a dial so that a desired number of cartons may be taken from any line.

There are three car-loading stations on the dock, and deflectors on the main line deflect cartons to pusher-bar inclined conveyors, which carry the cartons to the first floor car-loading sites. Portable gravity conveyor sections are used from this point to the cars.

Hydraulic roll lowering table

The Murco hydraulic roll lowering table has been improved by the addition of a bridge that can be raised or lowered to permit access to the paper machine or lengthen the receiving portion of the table, respectively. It operates by lowering the bridge receiving section to the height required by the paper machine, rolling the paper onto the table, and lowering the paper roll to the floor or skids, according to requirements.

Automatic roll wrapping machine

A new Stadler-Hurter automatic roll wrapping machine, manufactured by D. J. Murray Mfg. Co., is completely automatic from the time the roll is placed on the wrapping drum. It wraps rolls from 24 to 44 in. in diameter and 18 to 84 in. long. Its capacity is about one roll per minute.

Two Beloit machines in record performance

Fastest producer of newsprint in the world is the No. 1 machine at Bowaters Southern Paper Corp.'s mill in Calhoun, Tenn. — a 252-in. Beloit machine.

K. O. Elderkin, Bowater's general manager, announced the new record

Bauer DESIGNED . . . BASED ON EXPERIENCE

Here is a disc refiner that will bring out the quality of your stock. It is the Bauer "Pump-Through" Refiner, designed well for stock preparation especially in strength development. With this machine, it is possible to get high freeness, high tear at low horsepower.

This unique refiner is a "natural" for your mill. The pump-through feature eliminates the necessity of chests and provides a simple arrangement for series refining. Among the many prominent features are through-shaft, clean case lines, controls adaptable to remote and automatic operation.

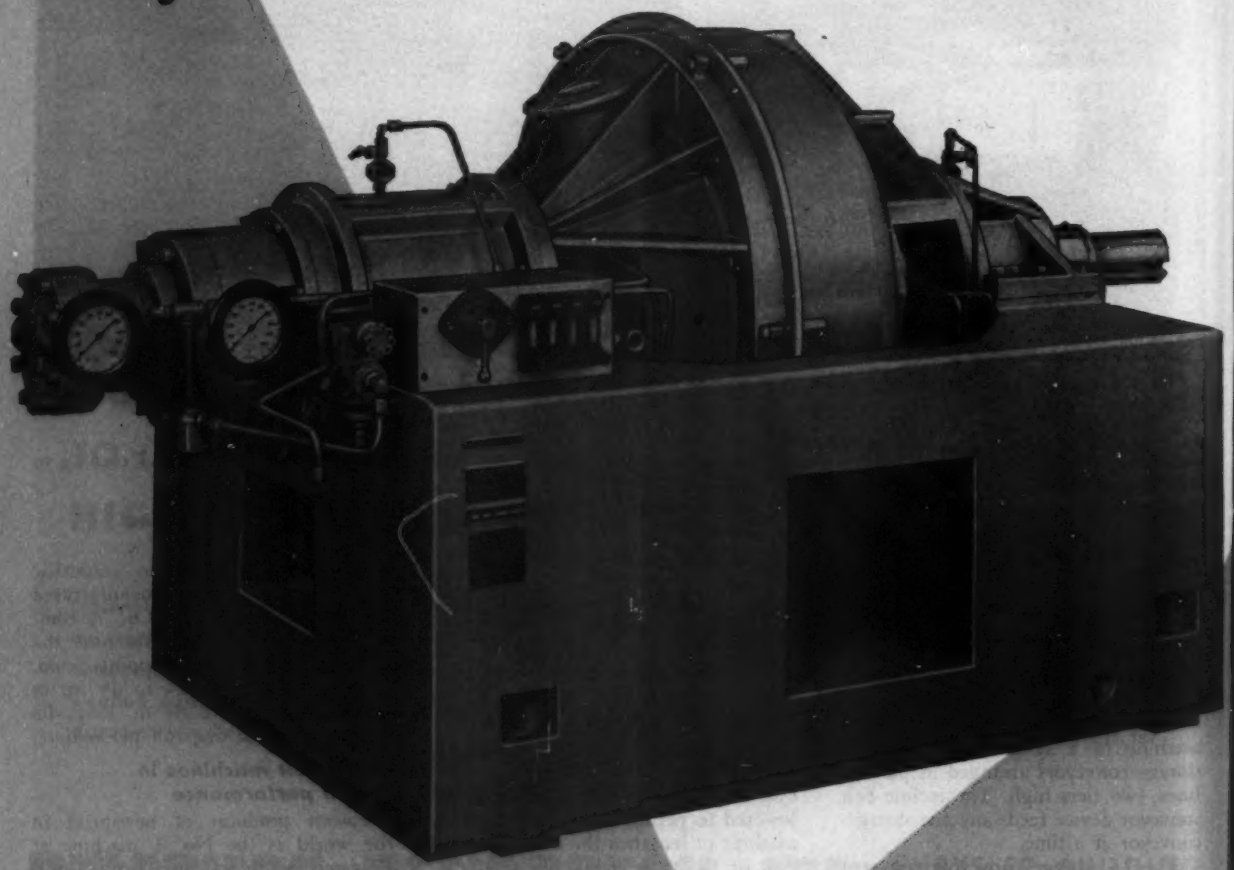
Pictured is the No. 442 Bauer Refiner with a 32-inch single revolving disc capable of accepting up to 400 hp. It is a compact, easily operated, proved unit that will surpass in performance and quality of stock the conventional beater, jordan, or other stock preparation refiners.

Ask your Bauer representative to acquaint you with the modern pump-through stock refiner.

THE BAUER BROS. CO.

DISC REFINER HEADQUARTERS

1800 SHERIDAN AVE. • SPRINGFIELD, OHIO



was set April 27, 1955, when the speed of the machine was increased from 1720 fpm to a record-breaking 2118 fpm in the remarkably short period of 3½ hrs. The record-breaking 252-in. Beloit machine features the aircushioned inlet and a suction pick-up arrangement. It is driven by a General Electric Co. multi-generator sectional drive.

The performance of this Beloit newsprint machine at Calhoun and continued experimentation at Beloit Iron Works confirm the feasibility of manufacturing newsprint generally in the speed range of 2500 fpm in the not-too-distant future.

Another record was established on a Beloit fourdrinier machine on August 3, 1955. This machine, owned by the St. Regis Paper Corp. of Jacksonville, Fla., was run at 2200 fpm on 50-lb. multi-wall sack stock. The run on this particular stock lasted for 20 hrs., and it is reported that there was not a single break during the whole 20-hr. run.

Dryer temperature control

A new automatic temperature control for individual dryers has been developed by Stickle Steam Specialties Co. to improve paper finish and to help prevent picking, curling, and cockling on all types of paper.

Final tests of the new control were completed recently on machines making tissue, board, book and writing paper.

Designed for use on the first wet end dryers, the new control automatically maintains the desired temperature of each dryer by regulating the temperature of steam inside the dryer.

The control consists of a thermostatic pneumatic pilot controller and diaphragm motor valve. A dial on the controller provides instant setting of any temperature desired. On standard units, the temperature range is 50 to 250°F. With special units a range of 150 to 350°F may be obtained. Once this temperature has been set, the controller actuates the valve, which responds quickly to meet the demand requirements of wet end dryers.

A new sizing agent

An alkylketene dimer, developed by Hercules Powder Co. under the trade name Aquapel, has been successfully used in a large number of mill trials during the year. Its effective use as a sizing agent stems from the fact that it reacts with the cellulose fibers of the paper to form strong, chemical bonds, resulting in the very hard and permanent type of sizing, or resistance to water penetration. It can be applied at the size press, size tub, calender box, coater, and by spray application. It is used at the rate of 2 to 6 lb. per ton of paper.

It is claimed that paper sized with Aquapel presents no problem in handling broke, which can be defibered in the same way as any other hard-sized paper. Paper sized with this product shows a high degree of resistance to lactic acid solutions, alkaline solutions, and other aqueous penetrants.

Liquid antifoams

National Aluminate Corp. recently announced a development of two new, low cost liquid antifoams, Nalco 71-B and 71-C, which are designed specifically for the paper industry.

Nalco 71-B is used for defoaming in bleach plants, defoaming and foam prevention in pulp mills, reducing entrapped air and froth problems. It is self-emulsifying and effective over a wide range of pH.

Nalco 71-C is developed principally for paper machine operation on the acid side and has high emulsion stability in all types of water. It is effective for cylinder machines making board, as well as in the production of newsprint and high-grade coated printing papers.

Nalco 236, a liquid slimicide and dispersing agent, is non-phenolic and contains no heavy metals — making it most useful in processing food packaging papers.

Corrosion-resistant rolls

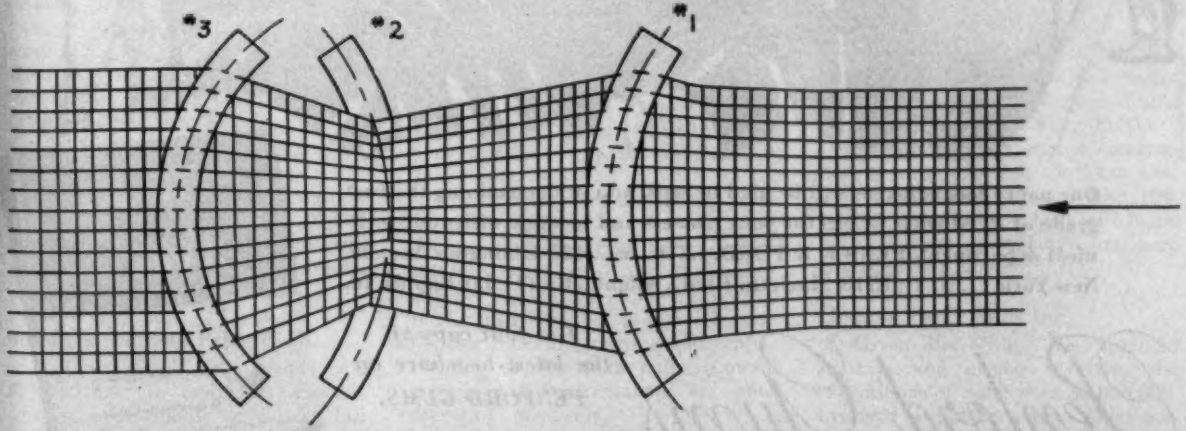
Research results at Battelle Institute show that stainless steel CF-8M comes closest to being completely corrosion resistant. In experiments conducted at various mills, this alloy invariably showed better performance when compared to that of currently used roll material.

New felt preserver

Mt. Hope Machinery Co. has developed a new felt preserver which now adds to the productivity of a number of paper mills.

The unit consists of three free-wheeling expanders, with one expander acting as a shrinker roll. The expanders are arranged so that the first is spreading the felt to full width, the second is shrinking it down as narrow as possible without wrinkling, and the third is spreading it out to the required width. This spreading, shrinking, and spreading action, together with a series of specially designed showers, actually dislodges the stock and dirt embedded in the felt and leaves the felt clean to operate at full width during its entire life.

In actual mill operation, felt life has been increased more than 50 per cent by the use of the Mt. Hope felt preserver.



Workings of the Mount Hope felt preserver: No. 1 expander spreads felt and opens weave; No. 2 expander squeezes weave together gently, while No. 3 expander spreads weave open to maximum width. Showers placed immediately after expander No. 3 wash out fiber and stock dislodged from felt by above "working" action

PENFORD GUMS ADD PLUS FACTORS

PENFORD GUMS, added to furnish, surface sizing or coating, either alone or resinated, gives high level pick
PENFORD GUMS provide a sheet surface that looks better, feels better, and prints better
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Penford Gums

Get your copy of the latest brochure on PENFORD GUMS.

U. S. Patents Nos. 2,516,632; 2,516,633; 2,516,634.

1955 sets new impetus to pulp and paper industry expansion

THE END OF WORLD WAR II witnessed a nation-wide industrial expansion. Hundreds of millions of dollars were spent in long-needed modernization, equipment replacement and plant construction.

One of the leaders in the general move toward increased production was the pulp and paper industry. Existing plants in the Northeast, Midwest and Northwest were greatly enlarged, and the latest equipment was installed, while a new, modern, and highly efficient industry arose in the South — all culminating in the record breaking expansion of 1951.

Four years of war had stifled production in all fields. Pulp and paper were no exception. The need was tremendous, and that need spurred a frantic search for new production methods—and for virgin territory in which to establish mills. The results were many and varied, but among the most vital to the future of the industry were the increasing use of hardwoods and the almost unbelievable growth in the southern states.

While industrial growth after 1951 proceeded at a slower rate, sharply increased expansion activity in 1955 shows that the industry is again on the move. Expansions of major proportions are being announced almost daily. Whether it be the $100,000,000 that West Virginia Pulp & Paper Co. is earmarking for company-wide modernization and expansion or a comparatively minor project undertaken by a small firm, the industry on the whole is not sitting still. It is looking to the future.

Almost impossible would be a complete compilation of every expansion project undertaken by the United States pulp and paper producers and converters during 1955. We have tried to list here some of the more important and those that are indicative of new productive trends.

Armstrong Cork Co.

of Lancaster, Pa., is doubling the capacity of its Macon, Ga. plant. The project will make the operation one of the largest fiberboard mills in the world. Existing buildings will be enlarged, and a second board mill will be built adjacent to the existing mill; additional grinding, pulping, screening, forming, drying, fabricating and painting equipment will be installed; the woodyard is to be rearranged, and warehousing and shipping facilities will be approximately doubled. In addition, a water recovery system will be installed.

Beckett Paper Co.

of Hamilton, Ohio, has completed plans for the purchase of a fourdrinier machine in a $1,000,000 expansion program. The unit will trim from 126 to 130 in. and will be rated to produce in excess of 60 daily tons of fine printing papers at speeds of up to 600 fpm.

Bergstrom Paper Co.

of Neenah, Wis., will construct a new finishing plant as part of a $1,000,000 expansion program. The firm will also make changes in two of its present paper machines.

Bowaters Southern Paper Corp.

at Calhoun, Tenn., will spend some $25,000,000 in expansion projects scheduled for completion by the fall of 1956. Focal point will be the installation of a 276-in. Beloit newsprint machine. By 1957 the firm anticipates an annual newsprint production of 270,000 tons.

The over-all expansion will cover almost all mill departments. Included will be the addition of a fourth stage brown stock washer; additions to bleaching and storage facilities; additional thickening and stock chests; the installation of another rotary barking drum and conveyors; a sixth digester; six Waterous Great Northern grinders, etc.

Brown Co.

has broken ground at Berlin, N. H., for a $3,500,000 bleachery that will enable the firm to add bleached kraft pulp to its already long list of forest products. Completion is expected in mid-1956.

Due to be completed this October is a new $2,000,000 steam generating boiler. The unit will cut the cost of steam production as much as 50 per cent. It will deliver 200,000 lb. steam per hour at 850 psi. Further savings will be made possible when the company installs a 7500-kw turbine next June.

Improvements are also being made in many sections of Brown's pulp division, including both the kraft and sulfite screen rooms and the sulfite digester house. An important project is the installation of a complete system for modern screening and centricleaning of the solka pulps. Cowan screens and centricleaners are now operating effectively.

In the paper division, three new pulpers are being put into operation. Installation of an 86-in. nine-roll calender stack will increase the Cascade mill's converting capacity.

Central States Paper & Bag Co.

has opened a plant in Palatka, Fla., to supply paper and plastic bags to the southeastern states. It is being supplied kraft paper by the Hudson Pulp & Paper Corp. mill three miles away.

Champion-International Co.'s

new debarking mill at Bow, N. H., highlights a long-range wood procurement and conservation program. Chief feature of the plant is the Andersson debarker, a Swedish machine that employs air-activated tools to remove the bark without wood loss. The mill and equipment represent an investment of $250,000.

Champion Paper & Fibre Co.

spent more than $8,500,000 for plant development during the year ended March 30. This year's expenditures are expected to reach $11,500,000.

The firm recently started construction of an addition to the Ohio Div. mill in Hamilton. Cost of the 104-by 162-ft. building, which will house pulp slushing machinery, has been estimated at $500,000.

Charmin Paper Mills Inc.

of Green Bay, Wis., has proposed an expansion project involving the expenditure of more than $8,000,000. Involved would be a new paper machine, increased pulp making capacity, and increased converting facilities.

Charmin is also completing a

STICKLE NEWS

Stickle Equipment
Cuts the cost of steam

Published by Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 18, Indiana

New Dryer Control Helps Prevent Picking, Curling and Cockling

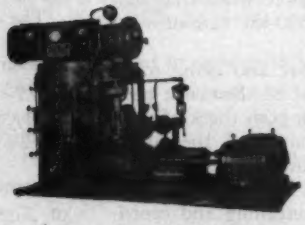
Following successful operating tests, Stickle has introduced a new control that automatically maintains the best temperature on individual wet end dryers. The control improves finish, and helps prevent picking, curling and cockling on all types of paper. It consists of a thermostatic pneumatic pilot controller and diaphragm motor valve. A dial on the controller provides instant setting of any temperature desired. Temperature ranges are 50° F. to 250° F., or 150° F. to 350° F. Once the temperature has been set, the controller actuates the valve which responds quickly to meet the demand requirements of the dryers. Two types of controllers are available. The direct controller (illustrated) is attached to the steam joint on the back side of the machine. A remote controller may be located at any convenient place in the mill. Test results and new literature are available on request.

Mill Selects Stickle Vacuum Pumps After Test

In 1953 one of Michigan's leading paper mills installed this Stickle 10-30 duplex vacuum pump as part of a test to improve dryer performance. For 12 months, the Stickle pump was operated continuously under every condition. Results of the test proved the Stickle unit superior in increasing dryer efficiency and lowering steam consumption. The mill promptly installed eight additional Stickle Vacuum pumps — one for each paper machine.

Learn how you can increase production and lower steam consumption through greater dryer efficiency — with the Stickle vacuum pump. Designed for paper mills, it handles vacuums up to 28". Only pump with built-in heat exchanger. Uses standard pumps and motors. No other pump as easy to service. Write for free Bulletin 260 today.

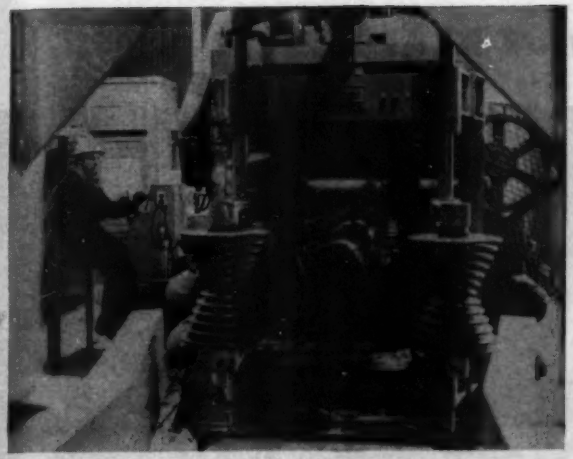
"X-Ray" view of the Stickle Open Coil Deaerating Feed Water Heater . . . guaranteed to heat more water to higher temperature in less space than any other heater at any price. Capacities: 3,000 to 300,000 pounds per hour.



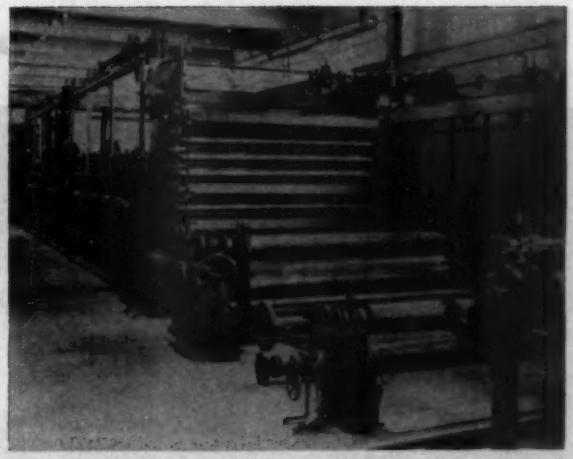
The Stickle Vacuum Pump is main unit of the Vacuum Differential Drainage System. Single and duplex models. Capacities up to 300 GPM (water) and 290 CFM (air); or 900 GPM (water only).

Stickle Visible Micro Adjustable Orifice permits accurate modulated temperature control on dryers with visible operation. Eliminates steam losses due to excessive "blowing through" into return lines.

Stickle Automatic Differential Valve controls exact differentials in pressure between two sections of paper machine, assuring proper drainage at all pressures.



ANDERSSON DEBARKER installed at Bow, N. H., by Champion-International Co. in a $250,000 construction project



NEW NO. 2 fourdrinier machine (Bagley-Sewall) that recently went into production at Chemical Paper Mfg. Co.

$3,200,000 plant to manufacture yeast from spent sulfite liquor.

Chemical Paper Mfg. Co.
has put into operation a new $1,000,000 Bagley-Sewall machine at Holyoke, Mass. Designed for the production of lightweight and medium weight sulfite and rag content papers, the unit operates at speeds of up to 600 fpm and adds some 3000 annual tons to the mill's capacity.

Consolidated Water Power & Paper Co.
has embarked on a $400,000 modernization program at the Ahdawagam Div. in Wisconsin Rapids, Wis.

Continental Paper Co.
of Ridgefield Park, N. J., renovated its No. 1 paper machine at an approximate cost of $500,000. The installation of an entirely new forming section permits increased uniformity.

No. 2 machine was equipped with clay-coating equipment.

Coos Bay Pulp Corp.,
a subsidiary of Scott Paper Co., has announced an expansion project to include a new wood preparation plant —two mechanical barkers, 112-in. chipper, conveyors, log hopper and wood handling crane.

Coosa River Newsprint Co.
will invest $3,000,000 in an expansion program at its mill in Coosa Pines, Ala. Some 20,000 to 25,000 tons will be added to present capacity.

Crossett Paper Mills
of Crossett, Ark., is expanding its woodyard and wood room facilities to increase capacity and also to make provision for the construction of a log pond for the wet storage of pulpwood. The work includes additional barking capacity, an elevated flume conveying system, log storage stacker, underwater storage for 25,000 cords of barked pulpwood, reclaiming by gantry crane, utilization of revolving turntable fenders, and a new multi-knife chipper.

Firm also has recently installed a Ross-Hooper (J. O. Ross Engineering Corp.) enclosed hood.

Plans for 1956 include a neutral sulfite semichemical pulp plant and a 216-in. Beloit cylinder machine.

Crown Zellerbach Corp.
will build a $750,000 green veneer mill near Portland, Ore., which will produce an annual 87,000,000 ft. of ⅜-in. material. Chips from the mill may be used in paper production at plants in Camas, Wash., or St. Helens, Ore.

C-Z will also install a 91-in. Beloit tissue machine at Los Angeles, where auxiliary and supporting equipment has already been installed at the firm's new converting plant.

The firm recently announced a program to expand production by at least 50 per cent over the next 10 years. At least $85,000,000 has already been earmarked for the purpose.

And announcement has been made at the company's San Francisco headquarters that a pilot plant will be built at Camas to produce an annual 2,000,000 lb. of dimethyl sulfide. The plant is to be in connection with the Camas kraft mill.

Fox River Paper Corp.
at Appleton, Wis., plans for the installation of an additional paper machine and the construction of additional power facilities.

P. H. Glatfelter Co.
of Spring Grove, Pa., will expand in a $12,500,000 program. Keystone in the project, which will increase paper output by 50 per cent, will be the installation of a Rice Barton Corp. paper machine. The unit will be one of the fastest machines of its type in the book and bond field, producing paper 176 in. in width at speeds of from 500 to 2000 fpm. A boiler is to be installed that will produce 250,000 lb. of steam per hour.

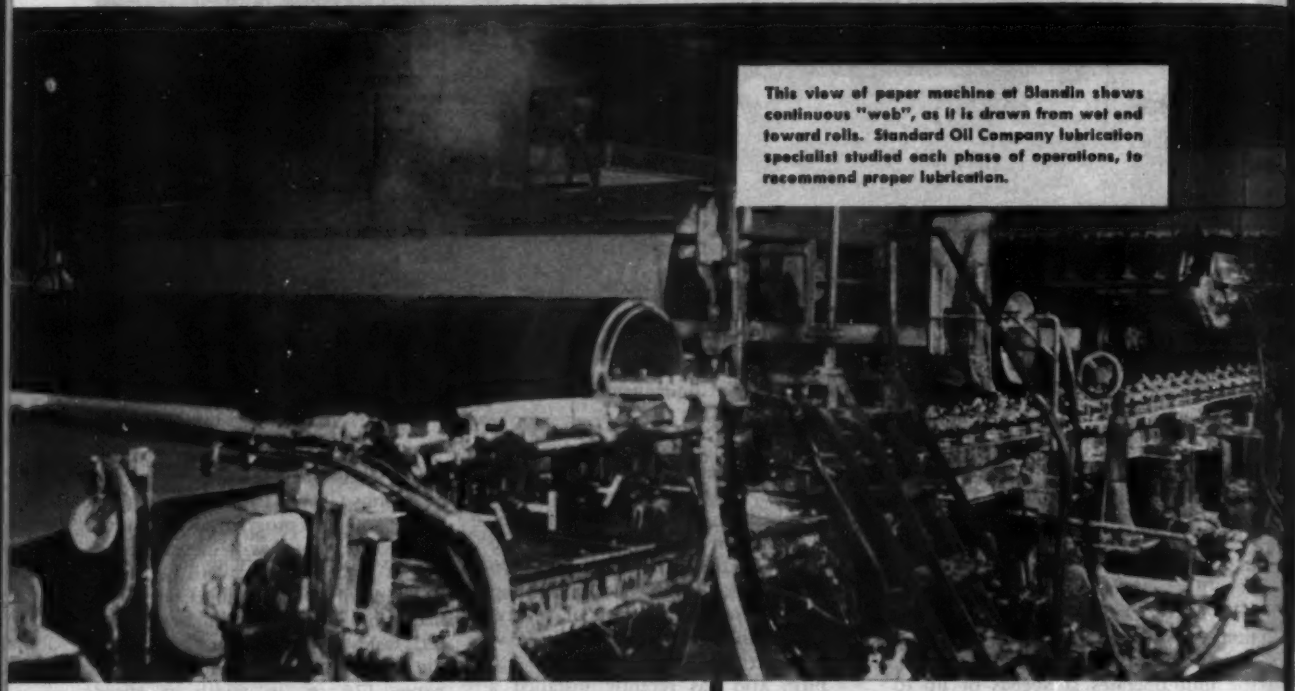
Great Northern Paper Co.
at East Millinocket, Maine, has produced the first commercial-volume high-quality newsprint from hardwoods by the chemi-groundwood process. The achievement was part of the first phase of a record-capacity mill expansion project recently completed by the firm. The initial expansion is scheduled to add 500 tons of daily capacity to the existing mill, with all equipment designed for an ultimate daily output of 800 tons.

Gulf States Paper Corp.
is building a 300-ton pulp mill on the Tombigbee River near Demopolis, Ala. Cost of the plant, which will produce market pulp, will be more than $12,000,000.

Halifax Paper Co.
has undertaken a $1,200,000 improvement project at its Roanoke Rapids, N. C. mill. Improvements in the pulp mill include the installation of sextuple effect black liquor evaporators, two stages of valveless vacuum washers, and the conversion of a recovery boiler from an oil-fired unit so as to make possible the recovery of additional chemicals.

Planned for No. 3 mill is the ad-

STANOLITH GREASE *overcomes trouble spot, keeps paper rolling at* BLANDIN



This view of paper machine at Blandin shows continuous "web", as it is drawn from wet end toward rolls. Standard Oil Company lubrication specialist studied each phase of operations, to recommend proper lubrication.

STANOLITH Grease aided the solving of a rough lubrication problem at Blandin Paper Company in Grand Rapids, Minnesota.

A bottleneck on the paper making machines threatened production at this hustling paper plant four years ago. The trouble occurred near the beginning of the process, where the pulp contains up to 99% water. At this point, bearings are greeted by a shower of water and stock.

Greases were quickly lost, literally washed away. Bearings were ruined early in life. Not only had greases failed in their duty but they caused paper staining.

A Standard Oil lubrication specialist recommended STANOLITH Grease for use on the wet end of the paper machine. It did such a good job that Blandin maintenance personnel put this multi-purpose grease to work on other applications, too. Now, except when open gear and brick greases are required, STANOLITH serves the entire plant, replacing a wide number of single-duty products.

STANOLITH is truly a multi-purpose grease. It may be used almost anywhere on the job, in mechanical or hand-operated dispensers. STANOLITH Grease is heat and water resistant. It will reduce grease inventories, eliminate waste and prevent costly application errors. Find out more about how STANOLITH Grease can help you do many tough lubrication jobs with just *one grease!* In the Midwest call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Blandin maintenance man, Fred Harwood (left), and I. A. Westerlund, Standard Oil lubrication specialist, inspect a table roll bearing. This is just one of many places in the plant where STANOLITH Grease provides top-efficiency lubrication.

I. A. Westerlund is a graduate of the University of Minnesota with an engineering degree. He is also a graduate of Standard's Sales Engineering School, and makes good use of his training in providing technical service to customers. He's been doing this for 14 years. His customers find this experience and training pay off *for them.*

STANDARD

STANDARD OIL COMPANY (Indiana)

CONSTRUCTION NEARING completion on new log pond at Crossett Paper Mills in Crossett, Ark., where expansion is underway

INSTALLATION OF the eighth Yankee type paper machine has been completed at the Northern Paper Mills Div. of Marathon

dition of two felt dryers and two finishing jordans.

Hammermill Paper Co.
of Erie, Pa., has put its new bleached semichemical pulp mill into operation. Using local hardwoods, the plant has a capacity of 100 tons per day. Design calls for an early expansion to a 200-ton unit.

Hinde & Dauch Paper Co.,
a subsidiary of West Virginia Pulp & Paper Corp., has recently placed in operation at Gastonia, S. C., a $2,350,000 box plant and plans a similar installation at Kansas City, Kan.

Hudson Pulp & Paper Corp.
is constructing at Palatka, Fla., a 75,000-sq. ft. laboratory that will be devoted to research in product development, by-product utilization, raw material recovery and improved papermaking and pulp processing techniques.

Inland Container Corp.
is constructing a $1,000,000 corrugated box plant at Krannert, Ga.

International Paper Co.
has announced plans to build a $20,000,000 newsprint mill at Mobile, Ala. Operation of the 100,000-ton plant is scheduled for the latter part of next year. A 282-in. Beloit machine is on order.

Kalamazoo Vegetable Parchment Co.'s
1955 expansion plans at its Kalamazoo, Mich. mill included the rebuilding of power plant facilities at a cost of more than $2,000,000. The first step involved the installation of a high-pressure boiler and a 7500-kw turbo-generator. Was to add four savealls at the paper mill and to install four-and six-color presses and enlarge gravure press to make four-color printing possible.

Kalof & Co.
a firm owned by Sam Kalof, president of Quaker Container Corp. of Los Angeles, will build a $1,500,000 pulp and paper mill at Port Hueneme, Cal. Pulp will be manufactured from waste paper.

Kimberly-Clark Corp.
has taken the first steps in a long-term company-wide printing paper expansion program by the installation at Kimberly, Wis., of a new high-speed coated paper machine. Other phases of the expansion include the modernization of the system for the preparation of raw materials, for pulp bleaching, and for paper finishing.

Firm also has under construction a mill in Fullerton, Cal., to manufacture and convert sanitary creped wadding products for West Coast markets. Operation of the new plant, which will boast 250,000 sq. ft. of working area, is expected early in 1956.

Longview Fibre Co.
of Longview, Wash., will install paper machine No. 7. The unit will have a daily capacity of 150 tons when producing lightweight kraft papers and 250 tons when making containerboard. Three additional digesters and the necessary related equipment are being installed in the kraft pulp mill to supply the pulp required for the expanded production.

Marathon Corp.
has announced plans for a long-range development and expansion program in the South. The firm is purchasing a mill site in Alabama and a connecting carrier railroad in Alabama and Mississippi.

Marathon recently placed in operation its new food packaging manufacturing plant in Modesto, Cal. Equipment includes printing presses, cutting and creasing machines, waxers and folders.

And at the Northern Paper Mills Div. in Green Bay, Wis., the firm has installed a Beloit Yankee type paper machine with a wire width of 172 in. and a trim width of 162 in. While at Neenah, Marathon has under construction a plant to produce labels and specialty papers for food and general packaging.

Mead Corp.'s
Heald Div. at Lynchburg, Va., will install a neutral sulfite recovery plant that will cost in excess of $1,000,000.

Minnesota & Ontario Paper Co.
at International Falls, Minn., has modernized No. 3 paper machine at a cost of well over $300,000. Concentrated on the wet end, the project involved the installation of four 3A Bird screens, new Bauer stock cleaning equipment, new Valley headbox and slice, and a new mixing pump.

Also at International Falls, Mando has installed a new steam generating unit and topping turbine electrical generator. The generator will have an hourly rated steam capacity of 240,000 lb. at 1290 psi at 800° total temperature. Designed to utilize a full range of fuels, including lignite, the high-pressure unit will also be adaptable to gas and oil.

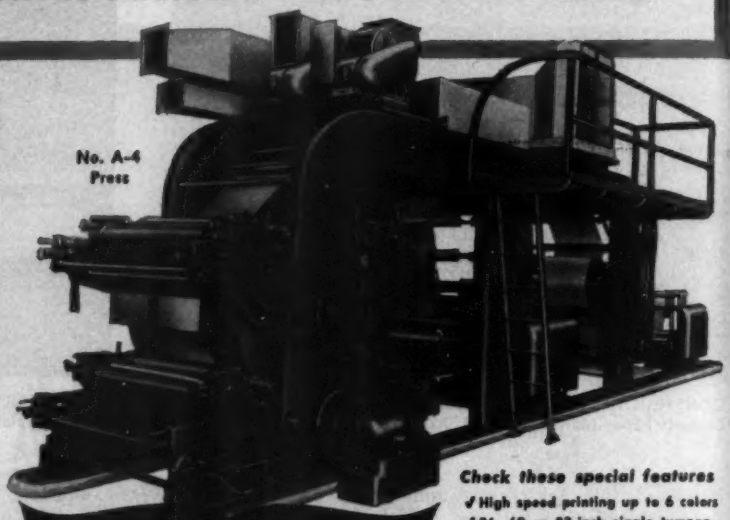
The Insulite Div. is aiming at the production of higher density products. In addition to the installation of high

The world's fastest

CONSTANT REGISTER FLEXOGRAPHIC PRESS

Prints one to four colors in accurate register on all types of flexible, S-T-R-E-T-C-H-Y materials

Thin papers, cellophane, foils and all the new film type materials are printed in accurate color register on this increasingly popular press. Large drum type impression cylinder accurately controls web through all color stations. Automatic electric drives maintain constant web tension at all times and rewinder features flying splice for continuous production without roll change stoppage. Other features include splashproof fountains, hydraulic throw-outs, continuous operating ink units, drying ovens and sheet threading device. Standard press up to six colors in any width from 20" to 50"—print repeats 12" to 36". Larger presses on special order.



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Single Impression Cylinder

. . . Around which color stations are mounted, accurately controls material stretch or expansion permitting 24 hr. continuous register of all colors.

Write for new general line catalog on presses and allied processing machines.

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MACHINE CO. • GREEN BAY • WIS

Manufacturers of

Printers, Embossers, Folders, Interfolders, Waxers, Laminators, Wrapping Machines, Core Winders, Packaging Presses, Creepers, and Napkins, Toilet Tissue and Paper Towel Units.

Check these special features

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- Low range surface drying
- Continuous operating splash-proof ink fountains
- Automatic color throw-outs
- Prints 20" to 50", repeats up to 36"
- Continuous smooth drive operation
- Over-head lead for easy accessibility, better drying and handling
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A NEW and BETTER BEATER ADDITIVE

COLD WATER SOLUBLE

0.5 to 1% on weight dry fiber **reduces refining time up to 52%** while maintaining tensile strength and bettering formations. **Permits usage of higher percentages of short fibered pulps.** Finished paper has higher porosity, more fold endurance, less hygro-expansivity, less tendency to curl, and if pigmented, no "two-sidedness." **Wet strength** can be imparted by sizing with borated water and no difficulties re-pulping broke are created.

Add to water in pulper prior fiber. Works well with both acids and alkalies. For added details, see page 235 of PAPER AND PULP MILL CATALOGUE, 1954-55 Edition.

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Johnson Joint with SYPHON ELBOW

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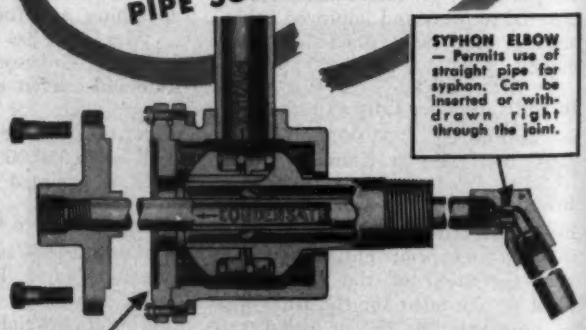

SYPHON ELBOW — Permits use of straight pipe for syphon. Can be inserted or withdrawn right through the joint.

ASSEMBLY PLATE— Holds internal parts of joint in position when head is removed.

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on this Type JP. Johnson Joints have written an unmatched service record . . . are first choice in mills all over the country . . . and can fit all operating needs.

The Johnson Corporation

845 Wood St., Three Rivers, Mich.

DRYER SECTION OF new Yankee tissue machine that recently went into operation at St. Helens Pulp & Paper Co.

PAPER MADE from whole bagasse comes off machine at Valentine Pulp & Paper Co., currently expanding production

density equipment, the plant's fiberboard coating and fabricating equipment is to be modernized. The one-story building extension to house the new and rearranged production facilities has a floor area of some 85,000 sq. ft.

National Gypsum Co.
has earmarked some $75,000,000 to be spent over the next five years for expansion. Construction of new plants at various locations is the primary goal; however, other funds will be spent for machinery, additions to existing warehouses, and for labor-saving devices at virtually all the firm's plants.

The firm also has under construction a $2,000,000 insulation board plant at Mobile, Ala.; will build a multimillion dollar cover paper manufacturing plant in Calhoun County, Ala., a gypsum wallboard and plaster board plant in New Orleans, and a similar plant in Burlington County, N. J.

New York & Pennsylvania Co.
at Lock Haven, Pa., has increased its finishing facilities 100 per cent. In addition, the firm is widening the wire of its No. 5 paper machine to 116 in.

Included in the $125,000 finishing room project: a 7500-sq. ft. increase in floor space; complete air conditioning; a cutter and trimmer; ream wrapping machine and conveyor; wrappers; hydraulic platform lifts; a heating and humidifying system, etc.

Northwest Ilreco Inc.,
recently organized firm, will manufacture a new type pre-fabricated half-gal. milk container in a $125,000 plant.

Oxford Paper Co.'s
1955 expansion projects at Rumford, Maine included screening systems for the Oxford sulfite and hardwood kraft mills; expansion of the machine shop in the mechanical repair department; installation of a winder at the dry end of "C" paper machine, and the installation of a bleeder turbine in the generator room of the steam plant.

The sulfite screen room, which has a daily capacity of 160 tons, is equipped with four primary Cowan screens, one secondary Cowan screen and 18 batteries of 20 primary centricleaners, three batteries of 20 secondary centricleaners, one battery of 11 tertiary centricleaners, two large auxiliaries, and one Bird scalping screen.

The kraft screen room, with a daily capacity of 300 tons, has 14 primary screens with a total of 623 centricleaners, two secondaries and one scalping screen.

Both screening systems are completely automatic, push-button operated.

Patterson Pacific Parchment Co.
will build a $500,000 plant in Sunnyvale, Cal., for the manufacture of parchment.

Peavey Paper Mills Inc.
of Ladysmith, Wis., is constructing a 275-ft. mill addition to house a recently purchased rebuilt paper machine.

Potlatch Forests Inc.
has started construction work on its multi-million dollar pulp and paper mill at Lewiston, Idaho. Production of bleached boxboard and unbleached corrugated material will be at the rate of 200 tons per day, bringing the firm's paper capacity to 525 daily tons.

R-W Paper Co.
has plant under construction at Longview, Wash., to produce an annual 100,000 tons of glassine and greaseproof papers. Total cost will be about $7,000,000. (R-W is a joint venture of Rhinelander Paper Co. and Weyerhaeuser Timber Co.)

Racquette River Paper Co.
of Potsdam, N. Y., will spend more than $1,000,000 on plant improvements. Firm is a subsidiary of Orchard Paper Co. of St. Louis.

Rayonier Inc.
will build a $30,000,000 cellulose plant. No site has yet been chosen, but it is expected that the mill will be in production within two years. The firm's output of cellulose will be boosted to approximately 880,000 tons annually.

Rhinelander Paper Co.
of Rhinelander, Wis., completely rebuilt its No. 3 paper machine at a cost of approximately $900,000. The unit is a Yankee with a wire width of 132 in. The rebuilding included the installation of pre-dryers, high-pressure Yankee dryers, a Beloit pressure headbox, Westinghouse drive, dryer control system, and a completely new stock preparation system.

Riegel Paper Corp.
has put its new coating tower in full-time operation at Millford, N. J. The equipment permits the firm to expand its production, as well as to coat new types of paper. The unit—with normal and reverse roll coating heads—permits thicker coatings. It is 125 ft. in length and coats a roll 66 in. wide.

(Continued on page 587)

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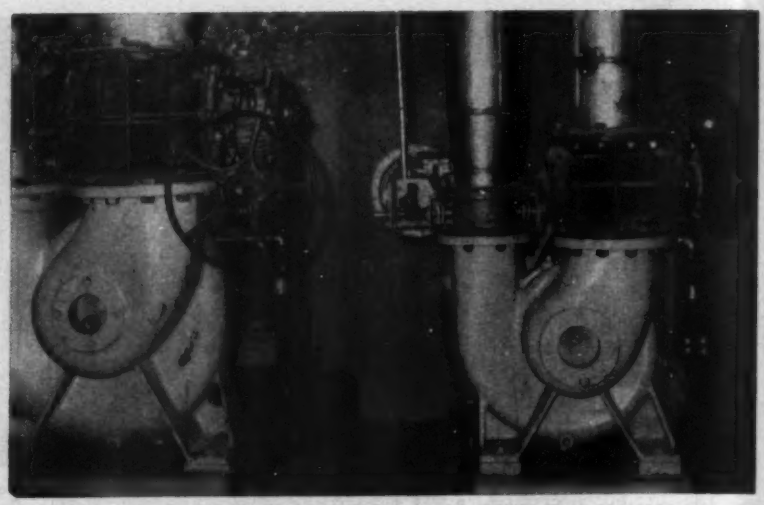
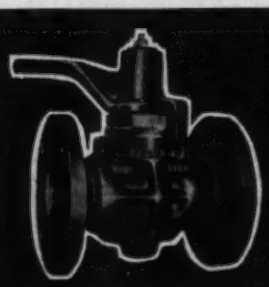
EASY-OPERATING
NON-LUBRICATED

PLUG VALVES SPECIFIED

IN SO MANY
NEW MILLS
FOR SO MANY
SERVICES!



DeZurik Worm-Gear Valves on the white-water pumping system of the Weyerhaeuser kraft mill at Everett, Wash.



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The unique principle of DeZurik Easy-Operating Plug Valves . . . . their eccentric rubber-faced plugs that insure drip-tight seating under all conditions . . . . their ease of operating and upkeep, with NO LUBRICATION or adjustment . . . . these factors have made them the preferred valves in mill after mill, both new and old. There's hardly a mill where DeZURIK VALVES aren't on the job!

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High quality, free-flowing material available for shipment to the paper industry from strategically located points.

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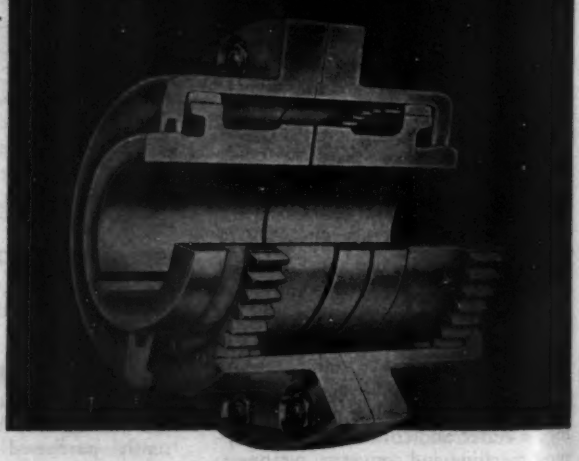

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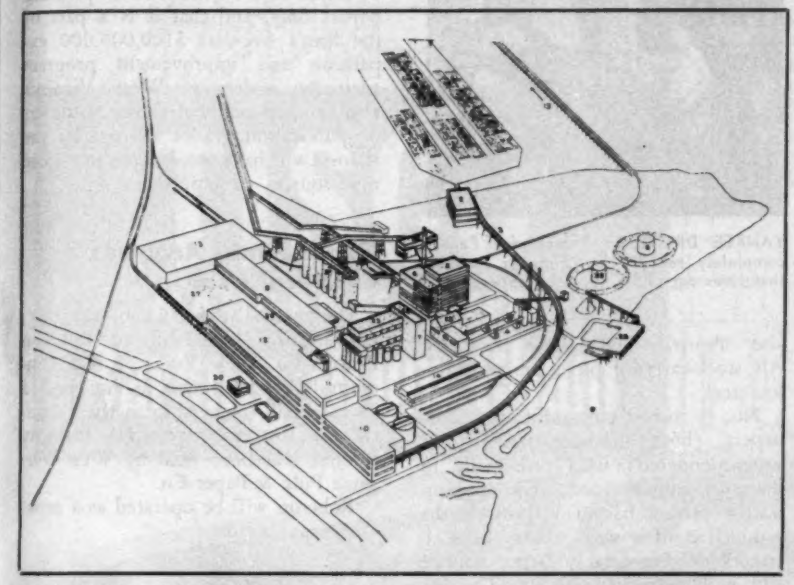
FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

NEWS of the INDUSTRY



DIAGRAMATIC SKETCH of MacMillan & Bloedel's Alberni mill shows new facilities planned in $35,000,000 expansion program: (1) Log pond; (2) wood room; (3) wood flume; (4) lime kiln; (5) recovery building; (6) boiler house; (7) digester extension; (8) pulp storage tanks; (9) specialty paper machine; (10) grinder room; (11) screen and bleach plant; (12) newsprint machine room; (13) warehouse; (14) machine shop and mill stores; (15) deep sea wharf, and (16) additional oil storage. The existing facilities are: (20) wood room; (21) chip silos; (22) digester building; (23) kraft washing and screening plant; (24) recovery furnace; (25) recausticizing building; (26) pulp drying and machine room; (27) pulp warehouse; (28) wharf; (29) oil storage, and (30) main office

MacMillan & Bloedel Project Underway

The official start of a $35,000,000 expansion project at MacMillan & Bloedel Ltd.'s Alberni (B. C.) Pulp and Paper Div. was made recently when W. A. C. Bennett, British Columbia premier, pulled a cord that started the driving of the first of some 7000 piles.

Scheduled for completion early in 1957, the addition will increase the capacity for sulfate pulps from 250 to 350 tons daily, will add a newsprint mill with a capacity of 300 tons, and a paperboard mill with a 180-ton daily capacity. Provision will be made for the possible future installation of a second newsprint machine and a second multi-purpose coarse paper and board machine.

Along with the 650-ton daily capacity of bleached sulfate pulp at the Harmac mill, the expanded facilities at Alberni will raise MacMillan & Bloedel's daily pulp and paper capacity to 1300 tons.

Coos Bay Installs New Preparation Plant

The installation of a new wood preparation plant and supporting equipment at the Anacortes, Wash. mill of Coos Bay Pulp Corp. "opens new avenues for the use of substantial quantities of alderwood in the manufacture of bleached sulfite pulp."

Undertaken in February, this major expansion provides for the delivery of alder to the mill either by truck or by rail.

In addition to the wood preparation equipment, construction also included facilities for improved pulp purification. Stock and caustic soda storage tanks, together with a new building to house the equipment, have been installed.

Of special interest, according to company officials, is the operation of two mechanical barkers. One of the units has been in trial use at the mill for a number of months. Logs are carried through the barker on trunion wheels, which rotate the sticks while the bark is being removed by side heads with angled teeth; rotating wire brushes located behind the heads remove the layers of bark.

Other equipment installed in the new debarking plant includes a 112-in. log chipper; conveyors, and chip feeders. Auxiliary equipment and construction have been listed as follows: a truck unloading ramp; wood storage areas; railroad spur; large crane for wood handling.

Coos Bay is a wholly owned subsidiary of Scott Paper Co. The major portion of production at Anacortes will be shipped to the new Scott mill at Everett, where it will go into the manufacture of sanitary paper products.

Marathon Corp. Reveals Southern Expansion Plans

Plans for a long-range development and expansion program in the South were disclosed recently when Marathon Corp. announced that it is purchasing a pulp and paper mill site in Alabama and a connecting carrier railroad in Alabama and Mississippi.

First step in the project was the acquisition of the Meridian & Bigbee Railroad Co., which operates between Meridan, Miss., and Myrtlewood, Ala. Included in the road's assets are 50 miles of track and the necessary diesel-powered equipment.

In announcing plans for the firm's first manufacturing venture in the South, John Stevens Jr., president of Marathon, declared that the construction program is yet in the development stage.

"Based on Marathon's growth in the food packaging and household paper products industries," Mr. Stevens said, "it was almost inevitable that we should look to the South for new sources of raw materials."

Marathon's decision to purchase the mill site on the Tombigbee River in the vicinity of Myrtlewood and Naheloa, Ala., was influenced largely by the fact that the location is readily

accessible to southern pulpwood sources via rail, highway and water.

Pulpwood in the area consists primarily of southern softwoods, such as short leaf and loblolly pine. An adequate supply of usable hardwoods is also available.

Although the engineering timetable is still in the planning stage, Mr. Stevens declared, primary consideration will be given to the construction of an integrated pulp, paper and paperboard mill.

Bergstrom to Expand at Cost of $1,000,000

Bergstrom Paper Co. of Neenah, Wis., will construct a new finishing plant as part of a $1,000,000 expansion program. The firm will also make changes in two of its present paper machines.

The new finishing plant, completion of which is expected next spring, will provide storage space for both raw materials and finished products. The structure will be located on a 58-acre site. Measuring 280 by 280 ft., it will be one story in height and will provide 80,000 sq. ft. of floor space for operations and storage. A two-story structure will house offices, locker rooms, first-aid room and meeting rooms. A separate boiler plant and a 100,000-gal water storage tank will be nearby.

Rhinelander Expands Sulfite Paper Capacity

Rhinelander Paper Co. of Rhinelander, Wis., has completed the rebuilding of its No. 3 paper machine. The project, which required a 74-day shut-down, resulted in an enlarged and modernized unit.

The rebuilding program cost more than $1,000,000 and was another major step in the firm's plant improvement and expansion project, which since the end of World War II has represented an investment of $16,000,000.

No. 3 is a Yankee-type machine, now designed to produce a 123-in. sheet at high speeds. Additions to the unit include: larger and better stock preparation equipment; a pressure-type inlet for distributing pulp stock to the wire; an entirely new pre-dryer section; a new Yankee dryer; an automatic reel; a new steam turbine drive; anti-friction bearings,

YANKEE DRYER on Rhinelander Paper's completely rebuilt No. 3 paper machine that turns out sulfite specialty papers

and improved lubrication facilities. All stock-carrying pipes are of stainless steel.

No. 3 turns out sulfite specialty papers (both machine-finished and supercalendered) used principally in the packaging of foods. The modernization project has made possible the production of a wide variety of such papers in considerably larger volume and with improved quality. The latter particularly involves formation and density of the sheet.

Whiting Orders Machine

A major investment in new equipment has been announced by Whiting Paper Co. of Holyoke, Mass. The firm recently ordered a new paper machine from J. H. Horne & Sons Co. of Lawrence.

According to reports, the machine will have a 90-in. trim, considered wide in the fine paper trade, in which Whiting has specialized during its 90-year history.

Celgar Signs Forest Management License

Celgar Development Co. has signed a forest management license with the provincial government for 857,000 acres of timberlands in southeastern British Columbia.

The firm has also agreed to erect a 300-ton pulp mill at Castlegar at an estimated cost of $30,000,000. Construction is scheduled to begin in 1958, with completion planned for 1961.

Celgar first made application for the license in 1951. The firm is a subsidiary of Celanese Corp. and is associated with Columbia Cellulose.

West Virginia to Expand in Printing Grades

West Virginia Pulp & Paper Co. has decided to expand its activities in the higher quality printing grades, where its chemical pulps can be used to greatest advantage.

The company stated that the shift in emphasis is in the field of printing papers only, and that it is a part of the firm's five-year $100,000,000 expansion and improvement program currently underway. West Virginia also pointed out that those customers of publication grades affected by the change will have ample time to choose new sources of supply.

Hammermill Acquires Chemical Firm

Hammermill Paper Co. of Erie, Pa., has acquired ownership of Robeson Process Co., New York, N. Y. Hammermill reported that it has had a "substantial" ownership in the chemical firm for many years. A majority interest had been held by West Virginia Pulp & Paper Co.

Robeson will be operated as a separate organization.

National Gypsum Earmarks $20,000,000 for Expansion

National Gypsum Co. in Buffalo, N. Y., has earmarked another $20,000,000 for expansion, according to Melvin H. Baker, chairman of the board.

The money, which has already been appropriated, will be spent for machinery, additions to existing warehouses and labor-saving devices in virtually all the firm's plants, of which there are 39 either in operation, under construction, or planned.

Scott to Expand at Mobile Mill

Scott Paper Co. at Chester, Pa., has announced plans for a multimillion dollar installation of additional pulp and papermaking and converting equipment at the Mobile, Ala. mill. As a result of the project, the firm will manufacture the first household products ever produced in the South under the Scott name.

The pulp equipment will include additional digester capacity, new recovery boiler equipment, and wood preparation and water treatment facilities. Together with the rearrangement of existing bleaching facilities, the equipment will make possible the

TISCO®
MANGANESE STEEL
Barking Drum Chain

prevents costly shutdowns

The slap and pound of barking drum chains on their sprockets provide ideal work-hardening conditions for TISCO Manganese Steel Barking Drum Chain. That is why this durable product lasts from two to nine times as long as other types used in this severe service.

The greatly simplified design of TISCO Barking Drum Chain not only increases strength but reduces the number of parts and speeds up assembly. It fits all sprockets and idlers. The center link is in one piece with no bushings to work loose or break. Large bosses on the side bars enlarge the bearing on the pins and greatly reduce both pin and link wear. The head pins are of forged, case-hardened alloy steel of either cottered or rivetted design.

TISCO is by far the longest-lived and most economical barking drum chain available.

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(Division of HARRISBURG STEEL CORPORATION)

Ask for further information regarding TISCO Barking Drum and other chains, Jordan Plugs, Demountable Plug Sleeves and Liners, Beater Rolls and Bed Plates, Rag Slitters, Sprockets, and miscellaneous castings designed to meet your own operating requirements.

HIGH BRIDGE 5, N. J.

Birmingham, Ala.; Cincinnati, O.; Easton, Pa.

Look Overhead . . . see "NORTHERN"

Paper Mill Crane designed for future wider span

This 59-foot span NORTHERN CRANE was recently installed in a newly built paper mill in North Carolina.

To provide for a possible future expansion and rebuilding of this mill, the crane has been designed and built so that it may be lengthened to approximately double this original span.

This installation reflects Northern's long, comprehensive experience in designing and building overhead electric cranes to deliver the particular services required by the paper mill industry; and to assure fast, safe, dependable operation in the wider bay buildings now preferred for industrial manufacturing.

Let us send you Bulletins G-700 and HL-115

NORTHERN MATERIALS HANDLING EQUIPMENT

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

production of a minimum of 120 additional tons of bleached pulp per day.

Paper facilities will include new high-speed papermaking machinery and roll tissue and towel converting equipment.

The present Scott plant at Mobile is one of the modern paper mills in the world. It was acquired by the firm in October 1954 in a merger with Hollingsworth & Whitney Co.

Riegel Completes First Run of Nylon Paper

Riegel Paper Corp. of Riegelsville, N. J., has completed the first commercial run of paper made wholly from nylon fiber. According to the firm, the high strength and chemical resistance of the paper suggests its use in such applications as heavy-duty bags, map and tracing papers. At present, the cost of manufacturing nylon paper is considerably higher than that of paper from rag or wood pulp, but costs can be expected to decrease as production increases.

Paper Industry Prospects Called "Exceedingly Bright"

The paper industry, an excellent indicator of general business activity, will find 1955 another peak year with prospects for the intermediate and long-term future "exceedingly bright," according to the investment management division of Calvin Bullock of New York, N. Y.

Total U. S. production for 1955, estimated at about 29,000,000 tons, will be almost 9 per cent above 1954, the previous peak year. Total U. S. paper and board consumption now approaches a 35,000,000-ton annual rate, compared with 26,000,000 tons in 1948 and 29,000,000 tons in 1952.

According to the Bullock firm, from the standpoint of timber resources for papermaking, the U. S. leads all other nations in the world. This nation's share of world paper production rose from 38 per cent in 1935-38 to 49 per cent in 1950-52. Ample resources are available to supply the increasing demand.

Kraft Has Largest Growth

Biggest growth in paper usage was in kraft paperboard, which rose to 38 per cent of total paperboard pro-

duction in 1953 from only 6 per cent in 1929. Kraft paper rose from 53 per cent of total coarse paper production in 1929 to 76 per cent in 1953.

Domestic newsprint production capacity, estimated to reach an annual 1,750,000 tons by 1956, is being expanded by the development of southern pine. Canada, which now supplies about 80 per cent of domestic newsprint requirements, can be expected to find new overseas markets "as European and United Kingdom recovery expands further."

The increased use of paperboard containers in the fruit and vegetable field and the almost universal trend toward supermarket shopping were among the factors mentioned as influencing the continued increase in paper usage.

Mead Corp. to Build Recovery Plant at Lynchburg, Va.

The Heald Div. of the Mead Corp. will install a neutral sulfite recovery plant at Lynchburg, Va., which will cost well in excess of $1,000,000. Primary aim of the project is to reduce stream pollution of the James River.

The recovery process to be used has been developed by Mead's Research and Development Department and is the result of extensive studies and pilot plant trials that have been carried on for a number of years.

The recovery plant consists principally of equipment for removing waste material now discharged into the James and converting it into usable chemicals. The greater percentage of waste from the plant derives from the pulping operation. With the new recovery plant, the waste now going into the river will be washed from the pulp and concentrated in evaporators to a point where it can be burned in a furnace. The ash resulting from the burning operation will be converted into chemicals suitable for re-use in the pulp mill operation.

Expansion Permitted

Mead does not at present have plans to increase production at Heald. The new equipment, however, is being designed to handle waste in volume approximately 65 per cent greater than that now coming from the mill. At peak volumes, the new Mead process is expected to remove approximately 60 to 70 per cent of the harmful solids and organic material from the waste.

Engineering is now going ahead under the direction of the division engineer, W. P. Guenther. Construction and installation, which also will

Rated performance of every Nash Vacuum Pump is assured by this precise laboratory test

Rated capacities of Nash Vacuum Pumps are not theoretical. Every Nash Pump is tested individually. Air capacity is determined by delivery thru accurately machined and calibrated orifices. Related vacuum is measured by precise mercury column, and horse power is recorded electro-dynamically. Records of these tests are retained by us, and certified copies are available to Nash Pump owners.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

NASH ENGINEERING COMPANY

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News of the Industry . . .

be handled by local personnel, will begin shortly after the first of the year. It is hoped that the new plant will be placed in operation by the end of 1956.

Mexico's First Newsprint Mill to be Built by P&W

Contracts for the building of the first newsprint mill in Mexico have been signed in Mexico City. The construction of the entire plant has been awarded to Parsons & Whittemore Inc. P&W will supply the paper machine from the plants of its affiliate, the Black-Clawson Co. of Hamilton, Ohio.

The mill, which will be operated by Fabricas de Papel Tuxtepec S. A. de C. V., will produce 33,000 tons of newsprint annually, using Mexican pine. This is about half the newsprint requirements of Mexico.

Located approximately 400 miles south of Mexico City, the Tuxtepec mill will cost an estimated $12,000,000 and is expected to be in operation by the end of 1957.

A CHECK FOR $500 is presented to Prof. C. E. Libby (l) of the School of Forestry at North Carolina State College by Edgar Winne, director of purchases for Dixie Cup Co.

Dixie Cup Becomes First Associate Member of N. C. Foundation

Dixie Cup Co. of Easton, Pa., recently had the honor of becoming the first associate member of the Pulp and Paper Foundation in the School of Forestry at North Carolina State College in Raleigh.

A check covering annual fee of $500 was handed to Prof. C. E. Libby, head of the curriculum in pulp and paper technology, by Edgar Winne, director of purchases for Dixie.

Dixie, one of the largest producers of paper drinking cups and food containers in the United States, purchases substantial quantities of paper from the southern mills that last year banded together to form the Pulp and Paper Foundation. The purpose of the group is to increase the supply of technically trained men that has not kept pace with the rapid expansion of the paper industry in the South.

In addition to Dixie, a large number of equipment and chemical suppliers have recently become associate members of the Foundation. They include Beloit Iron Works, Cameron Machine Co., Samuel M. Langston Co., Appleton Wire Works, Clark & Vacario Co., Rotareaed Co., J. O. Ross Engineering Corp., Bauer Bros. Co., Sutherland Refiner Corp., F. C. Huyck & Sons, Lockport Felt Co., Asten-Hill Mfg. Co., and Charles T. Main Co.

St. Regis Begins Major Expansion in Jacksonville

St. Regis Paper Co. has announced that work has started on its major expansion program at Jacksonville, Fla. Included are the installation of a 1000-ton kraft paperboard machine and the expansion of pulp production

RES-LIN wire saver SUCTION BOX COVERS are PROVEN by TEST

PROVEN BY TEST, this RES-LIN Suction Box Cover is establishing a new record for longer life and even wearing. It is engineered to meet the requirements of specific production problems of each particular paper machine.

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8. Requires no wet storage or care when machine is down.
9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

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facilities. It is expected that the expansion will be completed in May 1957.

Engineering the pulp mill program is J. E. Sirrine Co. of Greenville, S. C. Stevens & Rubens of Seattle are engineering the board machine, its buildings and auxiliary equipment. Construction work is being handled by Tidewater Auchter Construction Co.

The new Beloit Iron Works machine will have a maximum speed of 2500 fpm. Over-all length will be 650 ft., with a fourdrinier 276 in. in width that will produce a trimmed sheet 255 in. wide. It is being designed to produce paperboards ranging in weight from 38 lb. to 69 lb. per 1000 sq. ft.

To meet the power requirements for the expansion, a 30,000-kva turbogenerator will be installed, as well as two oil-fired steam boilers with a capacity of 200,000 lb. per hr., one bark-burner of 135,000 lb. per hour capacity, and two recovery boilers each with an hourly capacity of 140,000 lb. All steam will be generated at 625 lb.

In addition, two new lime kilns, 9 ft. in diameter and 250 ft. long, will be installed, together with two new precipitators; two new barking drums 12 ft. in diameter and 67½ ft. in length, and two large chippers approximately 100 in. in diameter.

Coming Events

Tappi

Sept. 19-21—Second Mechanical Pulping Conference, Poland Spring House, Poland Spring, Maine

Sept. 28-30—Sixth Testing Conference, Hotel Sheraton Kimball, Springfield, Mass.

Oct. 5-7—Fifth Corrugated Containers Conference, Morrison Hotel, Chicago

Oct. 19-21—Ninth Alkaline Pulping Conference, Hotel Patten, Chattanooga, Tenn.

American Pulp & Paper Mill Superintendents Association

Sept. 22-24—Northeastern Div., Poland Spring House, Poland Spring, Maine

Oct. 4-6—Southern and Southeastern Divs., General Oglethorpe Hotel, Savannah, Ga.

Oct. 21-22—Pennsylvania-New Jersey-Delaware Div., Pocono Manor Inn, Mt. Pocono, Pa.

Other meetings

Sept. 19-21—National Paper Trade Association, Conrad Hilton Hotel, Chicago

Oct. 17-21—43rd National Safety Congress and Exhibition, Chicago

Oct. 20-21—Forest Products Research Society (Northeast Section), Prince George Hotel, New York, N. Y.

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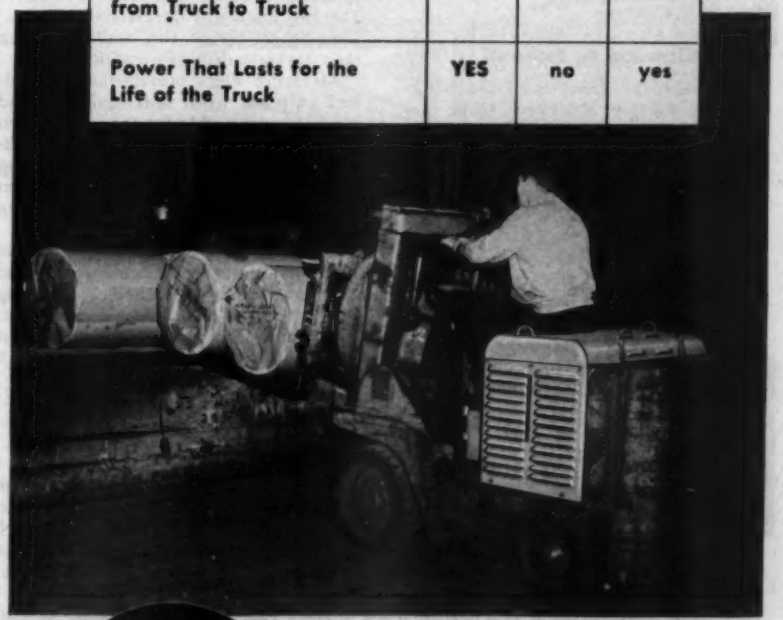

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ALLIED NEWS

Landegger New President of Downingtown Mfg. Co.

We have learned that arrangements have been completed, according to which K. F. Landegger will assume the presidency of Downingtown Mfg. Co. on September 20.

The operation of the Downingtown shop will continue unchanged.

It is the intention that the vacuum equipment line, especially the suction rolls, will be transferred to the Black-Clawson Co., which has previously not manufactured this line.

Black-Clawson to Expand

The board of directors of the Black-Clawson Co. of Hamilton, Ohio, has approved a plan "for materially strengthening the company's production capacity to meet anticipated future market demands, as well as the current high volume of paper machinery business."

Briefly, the plans call for an extensive tooling and foundry expansion program at the Bagley-Sewall Div. in Watertown, N. Y. Such a project is in line with B-C's intensified activity in the production of fourdrinier paper machines. Particular emphasis is being placed on machines for the high-speed production of newsprint and kraft papers.

Also included in the plans is a considerable expansion of the company's research and development program looking to the development of more and more new products for the industry.

It was also reported that the company's foreign operation, Black-Clawson International Ltd. Div., is proceeding with the expansion of its manufacturing activities at its British-European plant at Newport, England. Additional increases are being made in the subsidiary's London sales and engineering staffs.

Finally, the board of directors was apprised of Black-Clawson's contemplated expansion into new lines of equipment for papermaking and converting.

New Machinery Supplier Formed

The Lockport, N. Y. firm formerly known as Paper Mill Stores has reported the formation of a new and larger company to be known as United Paper Machinery Corp. United was recently incorporated for the purpose of buying, rebuilding and selling used and reconditioned pulp and paper mill machinery.

The new firm will utilize the present facilities and inventory of the former Paper Mill Stores and has acquired the complete inventory of the used paper machinery department of the Black-Clawson Co., which is suspending operations in the field of used equipment.

United Paper Machinery is expanding its own facilities to do all types of rebuilding and reconditioning.

Alexander Fleck Acquires Beach Foundry Ltd.

Alexander Fleck Ltd. of Ottawa, Ont., has acquired the common stock holdings of Beach Foundry Ltd., also of Ottawa. The two firms will integrate their operations on the Beach site, while retaining their separate corporate entities.

Alexander Fleck manufactures specialized pulp and paper mill equipment and has been responsible for the introduction and development in Canada of Fleck-Cowles pulpers and was the pioneering firm in the development of the modern stock preparation systems incorporating centralized control over all equipment.

Beach Foundry produces a complete line of electric, gas, combination and coal and wood ranges, domestic heating and winter air conditioning equipment. The firm operates one of Canada's most modern foundries and maintains branch warehouses at Winnipeg and Calgary.

Becco Expands Two Plants

Multi-million dollar plant expansion programs involving the hydrogen peroxide-producing facilities at Buffalo, N. Y., and Vancouver, Wash., have been reported by the Becco Chemical Div. of Food Machinery & Chemical Corp.

The Vancouver plant, one of the world's most modern and efficient facilities for the electrolytic production of hydrogen peroxide, will be enlarged by approximately 50 per cent. The estimated cost is more than $1,000,000. Production is anticipated during the early part of 1956.

The Buffalo expansion, according to the firm, "is indicative of Becco's constant search for methods of producing hydrogen peroxide of higher quality and lower cost, as well as production procedures that would not be limited by such factors as the availability of electric power or certain critical materials." Over the past 15 years Becco has spent several millions of dollars perfecting a low-cost non-electrolytic process. These efforts have culminated in the recent "on stream" operation of its new non-electrolytic producing unit located in Buffalo.

Allied News Briefs . . .

Worthington Corp. recently purchased a 15-acre factory site formerly owned by Crocker-Wheeler Electric Mfg. Co. in East Orange and Newark, N. J. Included are a dozen buildings totaling more than 330,000 sq. ft. of floor space. The acquisition will be used to partially accommodate two of the firm's major product divisions: the manufacture of large central station air conditioning equipment and the manufacture of standard pumps.

Continental Sulphur and Phosphate Corp. has started production at its sulfur refining plant at Sulphurdale, Utah. The plant has a daily capacity of 100 tons.

The Atlanta, Dallas and Memphis district offices of **Bailey Meter Co.** have moved to larger quarters. The new Atlanta office is at 1145 Peachtree St., N. E.; Dallas, 6615 Snider Plaza, and Memphis, 3355 Poplar Ave.

Emerson Mfg. Co., a division of **John W. Bolton & Sons Inc.** of Lawrence, Mass., has annuonced the appointment of United States Machinery Co. Inc. of New York, N. Y., as its exclusive export engineer and sales department.

National Starch Products Inc. has announced that construction has begun on an addition to its present Alexander Research Laboratories in Plainfield, N. J. The project is one of the steps in the firm's recently announced $3,500,000 company-wide expansion program.

Stauffer Chemical Co. is building a liquid aluminum sulfate plant at Tacoma, Wash. Completion is scheduled for October.

J. G. MacKechnie

N. W. Webb

Eastwood-Nealley Elects

The election of John G. MacKechnie as president and of Nelson W. Webb as executive vice president has been announced by Eastwood-Nealley Corp.

Secretary since 1943 and vice president and treasurer since 1948, Mr. MacKechnie was at one time with the law

firm of Lum, Tamblyn & Fairlie. Lum, Tamblyn & Fairlie have served for generations as counsel for the maker of fourdrinier wires.

Mr. Webb, a graduate mechanical engineer, joined Eastwood-Mealley in 1923 as a tool designer. He became superintendent in 1925, general superintendent in 1929 and vice president in 1947.

F. T. Peterson

Jack McKela

Black-Clawson Appointments

Frank T. Peterson, executive vice president of the Black-Clawson Co., has been elected a director of the firm. A graduate of Syracuse University, he joined B-C in 1947 and is currently a director of the company's British-European manufactory, the Black-Clawson International Ltd. Div.

In other Black-Clawson changes, Jack McKela, former member of the sales staff, has rejoined the Shartle Bros. Machine Div. sales. During an absence of almost two years from the organization, Mr. McKela served as mill manager of Atlas Paper Board Co. in Long Island City, N. Y. He returns to the Shartle Div. as executive sales manager specializing in the promotion and sale of stock preparation equipment.

And Lester M. Start, for 22 years associated with Rice-Barton Corp., has joined the Black-Clawson sales staff, according to an announcement by Sam T. Weber, sales manager of the Black-Clawson Div. in Hamilton, Ohio.

Allied Personalities . . .

Leslie H. Ricketts, former administrative assistant and assistant treasurer, has been elected administrative vice president of Lockport Felt Co., Newfane, N. Y. Three new directors were elected to the board: **Howard F. Brown,** vice president in charge of manufacturing; **Lester D. Carner,** secretary, and Mr. Ricketts.

Frank Briggs, formerly in the sales department, has been named to the staff of the Sales Development Department of Tube Turns, a division of National Cylinder Gas Co.

Wallace E. Gordon, assistant director of sales for the Grasselli Chemicals Department of E. I. duPont de Nemours & Co., has been made director of the firm's advertising department.

Frank F. Elliott has been elected president and chief executive officer of Crane Co.

Walter A. Reynolds, formerly a sales representative in southern Michigan and northern Indiana, has been appointed district manager at Garlock Packing Co.'s Denver office. He joined the firm at Boston in 1927.

William J. Kenny, vice president of Bankers Trust Co. in New York, N. Y., has been elected a director of F. C. Huyck & Sons of Rensselaer.

John R. Hopkins has been named assistant manager of the southern district sales office of the Becco Chemical Div. of Food Machinery & Chemical Co. A veteran of 20 years with the firm, he will headquarter at Charlotte, N. C.

New York Air Brake Co.'s Aurora Pump Div. announces recent additions to its eastern sales force: **Charles S. Quillen** has been appointed sales engineer in the New Jersey territory, while **Schuyler B. Sterling** will represent the newly established Domestic Water System Department, calling on eastern jobbers and distributors.

Frank L. Wilhelm, who joined the firm in 1936, has been elected assistant vice president of Rust Engineering Co. His most recent position was as procurement manager for the firm's large construction project at Oak Ridge, Tenn.

Gerald H. Lovins, former research director for American Instrument Co. Inc., has joined the staff of Photovolt Corp. He will devote much of his time to new product development.

"From ingot to fourdrinier wire"

Just as one alloy differs from another, so do their individual requirements for annealling vary. A definite ratio of speed and temperature must be used for each type. Skilled employees, tending our modern annealling furnaces, adhere faithfully to the proper speed-heat formulae so that your Eastwood wire will have the longest possible life.

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We are proud to say they are *truly* ours—"from ingot to fourdrinier wire".

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

NAMES in the NEWS

Alaska Pine & Cellulose Names Breitenbach

W. E. Breitenbach has been named executive vice president of Alaska Pine & Cellulose Ltd. Now vice president in charge of manufacturing for Rayonier Inc., he is making his new headquarters in Vancouver, B. C.

As executive vice president of Alaska P & C, Mr. Breitenbach will have responsibility for all the firm's operations. He replaces Paul E. Roberts, vice president and general manager, who returns to Abitibi Power & Paper Co. Ltd. in a senior executive position.

A graduate of the University of Wisconsin in chemical engineering, Mr. Breitenbach joined Rayonier in 1927 as chief chemist at Shelton, Wash. He was transferred to Hoquiam in 1929 as chief chemist in charge of the technical control laboratory. He was transferred to Port Angeles as resident manager in 1941, was made a vice president in 1944 and in 1951 was moved to Rayonier's executive offices in New York, N. Y.

W. E. Breitenbach

Dr. R. A. Diehm

Dr. R. A. Diehm Joins Western Mich. Staff

Dr. R. A. Diehm, executive vice president and general manager of Ward Paper Co. in Merrill, Wis., has joined the faculty of Western Michigan College in Kalamazoo as associate professor of paper technology.

This is the second major addition to the faculty this year. Miss Carola Trittin, technical director at Ward Paper, joined the college staff in June, also as an assistant professor.

A native of Indiana, Dr. Diehm graduated from Purdue and Rutgers universities. He received the Ph. D. degree in 1930. From 1929 to 1942, he was with Rohm & Haas Co. In 1942 he became associated with Container Corp. of America, later joining the staff of Cuneo Press in Chicago. Dr. Diehm came to Ward Paper in 1947.

G. W. E. Nicholson

T. T. Dunn

J. R. Lientz (center), new head of the Savannah plant of Union Bag & Paper, receives the congratulations of T. T. Dunn, vice president of manufacturing. Looking on is H. Y. Charbonnier, new head of the Pulp & Paper Div.

Union Bag Changes

Executive changes recently announced by Union Bag & Paper Corp. at New York, N. Y., include the appointment of G. W. E. Nicholson as executive vice president in charge of future planning and expansion. Formerly executive vice president in charge of manufacturing, in his new capacity he will be responsible for correlating the firm's future plans with developments in the rapidly-growing paper industry.

In another change, T. T. Dunn, formerly vice president and resident manager at the Savannah, Ga. plant, has been named vice president for manufacturing to succeed Mr. Nicholson. He will be responsible for all manufacturing and woodlands operations. Mr. Dunn was also recently named a director of Union Bag & Paper.

It has also been announced that J. R. Lientz has been named manager of the Savannah operations, and H. Y. Charbonnier is made new manager of the plant's Pulp & Paper Div.

Mr. Lientz, who has been with the firm since 1946, will be responsible for the operation of Savannah's Pulp & Paper Div., the Box Div., the Bag Div., the Technical Div., the Industrial Relations Div., and the Planning and Scheduling Department. In his new position, he succeeds Mr. Dunn.

Fair New Brown President

A. E. Harold Fair, executive vice president, has been elected president of Brown Co. following a meeting of the firm's newly chosen board of directors.

The board named Laurence F. Whittemore, formerly president and chairman of the board, to the formally-created post of board chairman — as provided at a recent stockholders meeting.

Stuart W. Skowbo, who was treasurer, was named vice president and treasurer.

Prior to joining Brown in October 1954, Mr. Fair was president of Alliance Paper Mills Ltd. and Don Valley Paper Co. Ltd. of Toronto, subsidiaries of Howard Smith Paper Mills Ltd. of Montreal.

Champion P & F Elects

At a recent meeting of the board of directors, Champion Paper & Fibre Co. of Hamilton, Ohio, announced the election of several new officers and the establishment of a management committee.

Reuben B. Robertson Jr. relinquishes his duties as president, a position he has held since 1950, because of his recent appointment as Deputy Secretary of Defense. He continues, however, as vice chairman of the board.

Reuben B. Robertson Sr. assumes the duties of president in addition to those he holds now as chairman of the board.

Dwight J. Thomson will serve as executive assistant to the president, while continuing his post of vice president in charge of industrial and public relations. Lewis Clark Thomson has been advanced from the position of assistant secretary to that of vice president for administration.

John W. Zimmerman and Karl R. Bendetson were named vice presidents and general managers for the Ohio and Texas divisions, respectively. A. S. Anderson becomes director of industrial relations and R. Calvin Skillman director of public relations.

A management committee was appointed to meet regularly to advise the president. Members include Reuben B. Robertson Sr., chairman; Dwight J. Thomson, secretary; Herbert W. Suter, Herbert T. Randall, Henry W. Rigby and Lewis Clark Thomson.

John L. Clouse Sr., formerly chief chemist, has been named technical assistant to the mill manager at Oxford Miami Paper Co. in West Carrollton, Ohio. Mr. Clouse, who joined the firm in 1928 as an Antioch College cooperative student, will serve as technical advisor on matters pertaining to quality and processing.

J. L. Clouse Sr.

P. F. Peterson

Paul F. Peterson has been named comptroller of Simpson Paper Co. of Everett, Wash. He assumes his new responsibilities in addition to his work as staff assistant in charge of purchasing equipment, supplies and material, personnel, labor relations and public relations. He has been with Simpson and its predecessor firm, Everett Pulp & Paper Co., since 1937.

Necrology . . .

G. F. Alcorn

Gerald F. Alcorn, 47, kraft mill superintendent for the Pulp Div. of Weyerhaeuser Timber Co. at Longview, Wash., died recently in Tacoma after a brief illness. He joined the firm in 1931 following his graduation from the University of Washington.

William R. Brown

William Robinson Brown, a leader in forestry management and conservation and an officer of the Brown Co. until his retirement in 1944, died August 4 at the age of 80.

Mr. Brown was a member of the original New Hampshire Forestry Commission, organized in 1909, and served as chairman until 1952. He set up in New Hampshire what is believed to have been the country's first effective system of forest fire lookout towers, and in 1917 he pioneered in the establishment of a forest fire insurance company.

Frank J. Pilot, 75, at one time general superintendent for Nekoosa-Edwards Paper Co.'s sulfite and sulfate mills, died recently in Wisconsin Rapids, Wis. He had worked for the firm 57 years.

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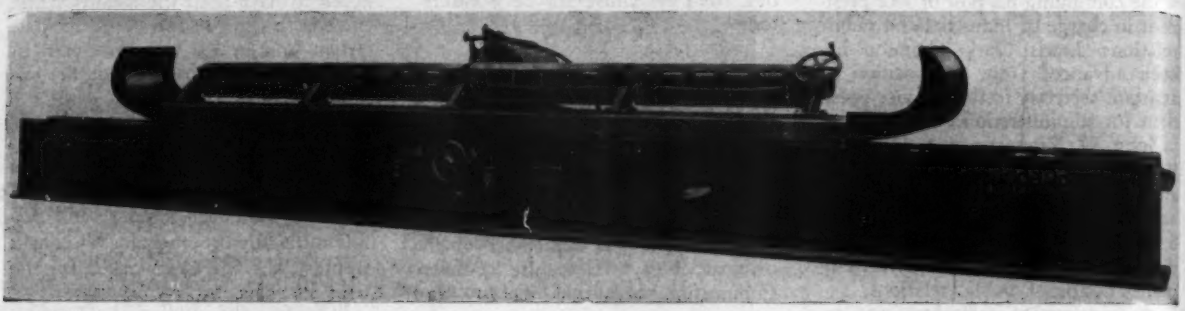

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CC-4 has been designed for heavy duty grinding of the top and bottom slitters equipped with a 2-speed ball bearing heavy duty spindle. Knife life can be increased as much as 30% . . . . . keep your knives in their original fine cutting condition.

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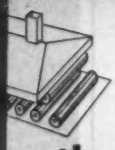

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SAFETY NEWS

Pulp & Paper Section Announces Program for 43rd Safety Congress

ADDRESSES BY THREE TOP executives from the paper industry will be among the highlights of the Pulp & Paper Section program at the forthcoming 43rd National Safety Congress. The Congress convenes in Chicago October 17-21 at the Conrad Hilton Hotel.

Speaking at the luncheon on Thursday, October 20, wil be Andrew J. Schroder II, vice president in charge of industrial and public relations for Scott Paper Co., Chester, Pa. His topic will be, "Behind the Statistics." Presiding at the program, which will also see the presentation of the Arthur Hoyt Scott Trophy, will be Fred O. Soughton, services and safety supervisor for LongLac Pulp & Paper Co. of Terrace Bay, Ont. (The Scott award goes each year to that company having the best accident frequency rate in multi-plant operations.

Two speakers will be featured at the Top Management program Tuesday: Howard E. Whitaker, president of the Mead Corp., who will discuss the topic, "Aggressive Thinking for Safety;" and Dwight J. Thomson, vice president and director of industrial relation for Champion Paper & Fibre Co., whose topic will be, "Thar She Blows."

A. J. Schroder II (above left)

H. E. Whitaker (above right)

D. J. Thomson (right)

Fritz Trophy Award

Highlighting the first day's meeting will be the presentation of the Edward Benton Fritz Memorial Trophy, which is given annually to the mill having the most outstanding safety record for the previous year. In charge of the award will be A. Scott Dowd, publisher of THE PAPER INDUSTRY, donor of the award.

Also on the first day's program is the progress report by the section's general chairman, Dallas E. Henry, safety coordinator for Southern Advance Bag & Paper Co. Inc. of Hodge, La., and the report of the nominating committee. In charge of the latter is Arthur Carle, safety director for Northwest Paper Co., Cloquet, Minn.

Speakers scheduled for the first day's program also include Robert J. Gell, staff assistant, and Earl Wallace, safety engineer, Paper Mills Div., Eastman Kodak Co., Rochester, N. Y.; William Coats Jr., assistant to the personnel director for the Mead Corp. in Lynchburg, Va., and Gordon Lemke, research engineer for Employers Mutuals of Wausau.

Round table discussions scheduled for Wednesday and Thursday afternoons include (chairmen in parentheses): Pulp Manufacturing (D. V. Hill, the Mead Corp.); Joint Session for Pulpwood Logging and Wood Products (Seth Jackson, United States Forest Service); Paper Manufacturing (Robert J. Gell, Eastman Kodak Co.); Folding Paper Box and Shipping Container (Ray Ketchmark, Folding Paper Box Association of America); Paper Converting (Harold Hewitt, Bemis Bros. Bag Co.), and Insulation and Roofing Products (Carl L. Eddins, Flintkote Co.).

122 Firms Report Perfect Scores for Six Months in NSC Contest

A 7-PER CENT rate reduction from the same period of last year has been reported during the first half of the 1955 Paper Industry Safety Contest sponsored by the National Safety Council.

Perfect scores recorded for the January-June period were as follows:

Division I—Pulp and Paper Mills

Group A

The Champion Paper & Fibre Co., Texas Div., Pasadena, Texas

Group B

P. H. Glatfelter Co., Spring Grove, Pa.
Consolidated Paper Corp. Ltd., Belgo Div., Shawinigan Falls, Que.
Crossett Paper Mills, Crossett, Ark.
Marinette Paper Co., Marinette, Wis.
Rayonier Inc., Fernandina Beach, Fla.
Riegel Carolina Corp., Acme, N. C.

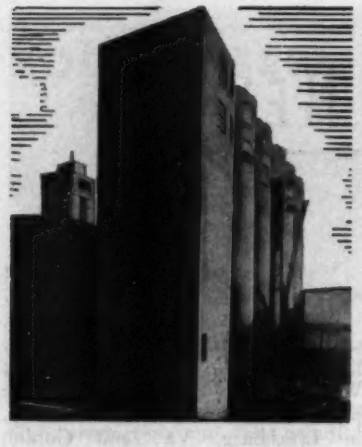
Group C

West Virginia Pulp & Paper Co., Williamsburg, Pa.
Puget Sound Pulp & Timber Co., Bellingham, Wash.
Manitoba Paper Co. Ltd., Pine Falls, Man.
Container Corp. of America, Lake Shore Plant, Chicago
Neenah Paper Co., Neenah, Wis.
National Vulcanized Fibre Co., Yorklyn, Del.
National Vulcanized Fibre Co., Newark, Del.
The Mead Corp., Sylva, N. C.
Container Corp. of America, Wabash, Ind.
Fraser Companies Ltd., Newcastle, N. B.
Price Bros. & Co. Ltd., Jonquiere, Que.
Weyerhaeuser Timber Co., Pulp Div., Springfield, Ore.
Abitibi Power & Paper Co. Ltd., Sturgeon Falls, Ont.
Rising Paper Co., Housatonic, Mass.
Riegel Paper Corp., Warren Mill, Riegelsville, N. J.

Group D

Certain-Teed Products Corp., East St. Louis, Ill.
Container Corp. of America, Los Angeles
U. S. Gypsum Co., Oakmont, Pa.
National Container Corp. of Virginia, Big Island, Va.
The Mead Corp., Wheelwright Div., North Leominster, Mass.

(Continued on page 580)



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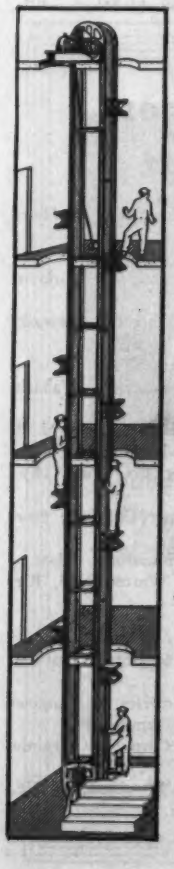

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Waterfalls Tissue Corp., Mechanic Falls, Maine
Strathmore Paper Co., Woronoco No. 1, Woronoco, Mass.
American Writing Paper Corp., Crocker Div., Holyoke, Mass.
Certain-Teed Products Corp., Pryor, Okla.
Coos Bay Pulp Corp., Anacortes, Wash.
U. S. Gypsum Co., Gypsum, Ohio
Allied Chemical & Dye Corp., Barrett Div., Elizabeth, N. J.

Group E

Certain-Teed Products Corp., Marseilles, Ill.
Celotex Corp., Madison, Ill.
Robert Gair Co. Inc., Middletown, Ohio
Spaulding Fibre Co. Inc., Milton Plant, North Rochester, N. H.
Celotex Corp., Metuchen, N. J.
Central Fibre Products Co. Inc., Denver
Flintkote Co., Mt. Carmel, Ill.
American Writing Paper Corp., Nonotuck Div., Holyoke, Mass.
Logan-Long Co., Amalgamated Roofing Mills Div., Chicago
Canadian Johns-Manville Co. Ltd., Asbestos, Que.
American Writing Paper Corp., Albion Div., Holyoke, Mass.
National Gypsum Co., Newburgh, N. Y.
Riegel Paper Corp., Riegelsville Plant, Riegelsville, N. J.
Container Corp. of America, Wilmington, Del.
Celotex Corp., Avery, Ohio
Johns-Manville Corp., Tilton, N. H.
International Paper Co., Livermore Falls, Maine
National Vulcanized Fibre Co., Marshall Bros. Div., Yorklyn, Del.
International Paper Co., Riley, Maine
Munroe Falls Paper Co., Munroe Falls, Ohio
Spaulding Fibre Co. Inc., Hayes Plant, North Rochester, N. H.

Division II—Paper Converting

Paper Bags

St. Regis Paper Co. Ltd., Three Rivers, Que.
Crown-Zellerbach Corp., Los Angeles
St. Regis Paper Co. Ltd., Vancouver, B. C.
Thilmany Pulp & Paper Co., Kaukauna, Wis.
St. Regis Paper Co. Ltd., Dryden, Ont.
Pillsbury Mills Inc., Wellsburg, W. Va.

Boxes and Cartons

Group A

General Foods Corp., Carton & Container Div., Battle Creek, Mich.
Bartgis Bros. Co., Ilchester, Md.
Container Corp. of America, Carton Div., Boston
Container Corp. of America, Container Div., Chattanooga, Tenn.
Mengel Co., Louisville, Ky.
International Paper Co., Container Div., Chicago

Group B

Container Corp. of America, Valley Forge, Pa.
Gaylord Container Corp., Atlanta, Ga.
Gaylord Container Corp., Greenville, S. C.
Container Corp. of America, Carton Div., Cleveland
Northeastern Container Corp., Bradford, Pa.
Gaylord Container Corp., Houston
Container Corp. of America, Boyle Av. Plant, Los Angeles
Container Corp. of America, Baltimore
Fonda Container Co. Inc., St. Albans, Vt.
Container Corp. of America, Carton Div., Chattanooga, Tenn.
Fort Wayne Corrugated Paper Co., Rochester, N. Y.
Container Corp. of America, Santa Clara, Cal.
Hoerner Boxes of Sand Springs Inc., Sand Springs, Okla.
Container Corp. of America, Greensboro, N. C.
Robert Gair Co. Inc., American Coating Mills Div., Grand Rapids, Mich.
Hoerner Boxes of Fort Worth Inc., Fort Worth, Texas
Container Corp. of America, Knoxville
Bradley & Gilbert Co., Louisville, Ky.
Dairypak Inc., Cleveland
Bay West Paper Co., Green Bay, Wis.
International Paper Co., Los Angeles
International Paper Co., Wooster, Ohio
International Paper Co., Springhill, La.
International Paper Co., Kansas City, Kans.
Container Corp. of America, Muskogee, Okla.
Mott Carton & Paper Co., St. Louis
Dairypak Inc., Fort Worth, Texas

Roofing Paper

Flintkote Co., East Rutherford, N. J.
Flintkote Co., Chicago Heights, Ill.
Ruberoid Co., Gloucester, N. J.
Bird & Son inc., Chicago
Certain-Teed Products Corp., Kansas City, Mo.
Ruberoid Co., Minneapolis
Ruberoid Co., Baltimore, Md.
Flintkote Co., Portland, Ore.

Insulation and Building Board

Armstrong Cork Co., Macon, Ga.

Specialties

Canadian Cellucotton Co., Niagara Falls
Lily-Tulip Cup Corp., Augusta, Ga.
Crown Zellerbach Corp., Western Waxed Paper Div., San Leandro, Cal.
Marinette Paper Co., South Glens Falls, N. Y.
Scott Paper Co., Cut-Rite Div., Sandusky, Ohio
Container Corp. of America, Sefton Fibre Can Co. Div., Piqua, Ohio
International Paper Co., East Point, Ga.
International Paper Co., Kansas City, Kans.
Lily-Tulip Cup. Corp., Chicago
Container Corp. of America, New Orleans
Lily-Tulip Cup Corp., Monticello, Ind.
Mid-West Wax Paper Co., Fort Madison, Iowa

Division III—Pulpwood Logging

None

FOREIGN ABSTRACTS

Study of the oxidative degradation of beechwood pulps

The degradation of these sulfite pulps are studied by the use of chain length distribution diagrams. The paper is in part a review. While they are processed in the formation of viscose, the beechwood pulps are fractionated by applying a precipitation technique to solutions of their derivatives. From subsequent chain length distribution diagrams, the author obtains data on their rate of degradation and also on their filterability.

Four pulps are studied. These show rather small differences in average degree of polymerization (both of the nitrates and the xanthates), and their alkali solubilities are also much the same. When, however, (under highly standardized conditions) a rapid "preripening" is applied, differences become more apparent. This preripening involves suspension of the pulps in alkali and treatment with 30 per cent hydrogen peroxide. The exact conditions are fully described. During the course of the oxidative degradation, certain sharp frequency maxima are shown in the diagrams which can possibly be explained by the occurrence of "weak links." However, these are only met with at temperatures *below* 22° C.

The author apparently can draw some conclusions regarding the pretreatment of the original pulps from chain length distribution studies made on staple fibers. He discussed the conditions needed for producing high-grade fibers and emphasizes the importance of chain length distribution studies through which new ways may be found to improve fiber quality. Werner Bandel. *Das Papier*, 9, 204-12 (1955) (in German).

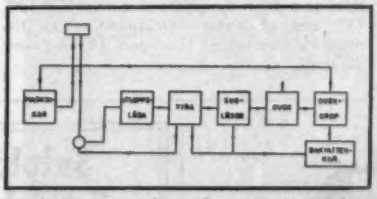
Hemicelluloses as impurities in filter paper

Whatman No. 1 paper which is used extensively in chromatographic sugar analysis contains small amounts of hemicellulosic impurities, which may possibly interfere in the microquantitative determination of sugars and which may also be related to the deterioration of paper on alternate wetting and drying. By extracting with water at 25° C., as much as 860 mg. of the impurity is removed from a kilogram of the paper. Smaller amounts of similar materials are isolated from cotton linters and from a purified wood cellulose.

The hemicellulose is precipitated from the aqueous extract by alcohol and purified through its acetate, which, after deacetylation, gives a polysaccharide with a specific rotation of -53° in water. On hydrolysis, the hemicellulose gives 53.6 per cent xylose, 15.2 per cent arabinose, 11.1 per cent glucose, 1.9 per cent galactose, as well as two acid components. In some samples, the sugar rhamnose is also indicated. The polysaccharide is being studied intensively. G. W. Huffman, P. A. Rebers, D. R. Sptiestersbach and F. Smith. *Nature*, 175, No. 4466, 990-991 (1955).

Influence on sheet properties of differences in speed between stock and wire

This study is carried out at the Central Laboratory of Swedish Paper Mills. Experiments are made at speeds between 100 and 200 m. per minute, with kraft pulps beaten to 30° Schopper-Riegler. In this



Maskinkar = machine chest; utloppslåda = head box; vira = wire; suglador = suction boxes; gusk = couch; guskgrop = couch pit, and bakvattenkar = white water tank

range of wire speeds, the maxima and minima of most sheet properties occur when the stock speed is 10 to 20 m. per minute lower than the wire speed. These maxima and minima are pronounced, and the closest sheet formation is obtained with an extended apron and moderate drainage at the forming box following the breast roll. With rapid drainage immediately after the slice, the influence of the difference in speed on the sheet properties is less pronounced.

The accompanying figure (one of twelve) shows a flow diagram of the wet end of the paper machine used in these experiments. O. Andersson and J. Bergstrom. *Svensk Papperstidn.*, 57, 735-40 (1954) (in Swedish, with English summary).

Blistering tendency of paper

The cockling or blister formation in paper was explained theoretically by S. F. Smith (*Paper-Maker, London*, 119, 185 [1950]), and the present authors have been able to confirm his theories experimentally.

By using Smith's directions, artificial blisters are formed in various sample sheets. These appear in those areas which dry more rapidly than the surrounding areas, because of lower moisture content or lower basis weight or because of higher heat transfer. In this way, blisters can be produced at will in predetermined portions of the sheet.

The authors investigated several variables that influenced blistering. The equipment used and the photographic technique are fully described and illustrated with 28 half-tones.

Blistering is augmented by any stresses that lead to increased shrinkage. Sheets that are prepared from beechwood pulps or from straw pulp show little tendency towards cockling when the degree of beating is low; but when the beating is carried to a higher degree, the sheets show more shrinkage than corresponding sheets made from coniferous pulps and show at least an equal tendency to blister. Mechanical pulps, which show the least shrinkage, reveal no blistering tendencies. Shrinkage and blistering in paper sheets decrease with increasing kaolin content. The degree of beating is apparently important, both in shrinkage and cockling properties. As the basis weight is lowered or as drying temperatures are increased, the danger of blistering increases.

The authors discuss techniques for reducing blister formation. These include uniform contact between the sheet and the heating surface and thorough drying. Ideally, the moisture of a sheet should not change on storage. Walter Brecht, Friedrich Müller, and Hermann Weiss. *Das Papier*, 9, 113-42 (1955) (in German).

Stock preparation for insulating board and hardboard

Insulating board and hardboard are usually made from wood waste with only a small amount from a poor quality pulpwood (which is generally unbarked). The author does not advocate the addition of tanning waste, peat, hemp chaff, or similar fibrous wastes, inasmuch as these usually lead to deterioration in quality; but pulpmill and groundwood rejects may be added in small quantities.

The stock preparation (especially in the case of insulating board) occurs in three steps. Defibration is followed by coarse refining of the screened rejects, and this is then followed by a second refining of the entire stock. With hardboard, the first two stages usually suffice.

The author discusses the effects of various methods of fiberizing on the resulting freeness of the stock, the percentage of long and short fibers and finestuff in the

Foreign Abstracts . . .

stock, and the suitability of the various stocks for manufacturing insulating board and hardboard. Defibrator stock is generally used for hardboard; chemical pulp is used only in admixture with other stock. Klaus Voss. *Wochbl. Papierfabrik.*, 82, 954, 956-8, 960 (1954) (original in German); through B.I.P.C., 25, 639 (1955).

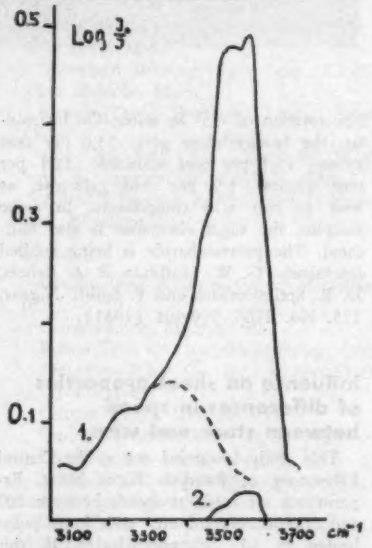
Quality control of bag paper in Germany

This is a report of the results of studies extending over several years, which were sponsored by the German Kraft Paper Association and the Association for Paper Bag Industries. These include a series of practical tests of filled bags and transport experiments.

The investigators attempt to correlate the strains placed on bags during actual use with the measured mechanical properties of the papers used in their manufacture. The results form what will be the methods of testing to be used by the two associations and give the minimum strength requirements for kraft paper (whose basis weight is 70-75 g. per sq. m.). The methods are given in the Associations' "Merkblatt 11." Friedrich Burgstaller and Richard A. Krauss. *Das Papier*, 9, 237-48 (1955) (in German).

Physicochemical properties of thiolignins

This is the first of a series of papers dealing with thiolignins and related compounds. The author presents evidence of hydrogen bond formation in spruce thiolignins by a comparative study with certain monomeric phenolic model substances.



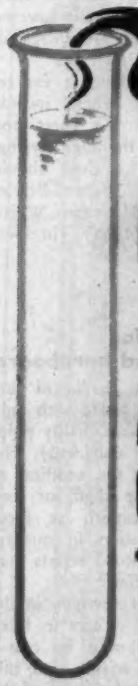
Infra-red spectra of the ether insoluble thiolignin from a sulfate digestion at 100° (1) and of water corresponding to the moisture content of the lignin (2). Solvent: dioxane

The thiolignins are obtained by a mild kraft cook at 100° C. extending over a six hour period. In dioxane solution, these lignins show infra-red absorption bands in the region of 3650 to 3200 cm^{-1}. By comparing these with the infra-red absorption bands of such model substances as catechol, guaiacol, vanillyl alcohol, vanillin, etc., it would appear that the bands originate from intra- and intermolecularly "hydrogen-bound" sterically hindered hydroxyl groups. The infra-red spectra and molecular weights determined cryoscopically in dioxane make it probable that in this solvent the lignins are tri-dimensional aggregates made up of basic units having molecular weights of approximately 800. Such units are held together by strong hydrogen bonding, and this type of aggregation is discussed.

The present results are in harmony with the work of previous investigators using other techniques. Twenty-six references. J. Johan Lindberg. *Paperi ja Puu* (*Paper and Timber, Finland*), 37, 206-8, 222 (1955) (in English).

Training workers in the Swedish pulp industry

Training of their own workers was first organized effectively about five years ago, although individual mills had already instituted such courses earlier. The training courses use modern visual aid



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methods and also make use of pamphlets. About 10,000 workers in the Swedish pulp industry have taken or are taking these courses (this respresents about 50 per cent of the total employed by the industry).

In the Fall of 1952, the Swedish Pulp Employers Federation began a special department dealing with educational problems, which focused mainly on the education of supervisors. In the winter of 1952-53, several successful two-day conferences were held, and in the autumn of 1953, several four-week courses were inaugurated at a school in Leksand.

In May, 1954, the Swedish Sawmill Employers Federation joined the work of the pulp mills, and a common group was established under the name of Pappersmasse och Sägverksforbundes Utbildningsavdelning (the PSU), which now serves both federations and deals with the educational and vocational training for both industries. Much attention is given to young workers, and great stress is placed on public relations and on information showing the future possibilities for these workers. Courses involving training in leadership for superintendents and assistant mill managers are now being arranged and will probably be given in the winter of 1955. This is the report of the rector of the PSU. *Norsk Skogindustri*, 9, No. 6, 188-94 (1955) (original in Swedish, with brief English summary).

Phenolic components of spruce sulfite spent liquors

The liquor is extracted with butyl acetate, and the following compounds are isolated by means of solvent fractionation, countercurrent separation, and chromatography: vanilloyl methyl ketone, vanillin, dihydroconiferyl alcohol, 3,3'-dimethoxy-4, 4'-dihydroxystilbene, and a new compound, $C_{20}H_{18}O_4$. Thirty-five references are given. E. A. Kvasnicka and R. R. McLaughlin. *Can. J. Chem.*, 33, 637-645 (1955).

Recovery of sulfurous acid from spent sulfite liquor

This is a very brief review of recent developments in sulfur dioxide recovery by stripping with steam. Emphasis is placed on practice in a Canadian mill in which the recovery amounts to 4.5 kg. of sulfur per ton of pulp (i.e., 4 per cent of the total sulfur consumption). In this operation, 65 kg. of steam at 110°C is used per cubic meter of spent liquor per hour. Eight references. E. Borchers. *Wochbl. Papierfabrik.*, 83, 276-8 (1955) (in German).

Ion-exchange properties of chemically modified cellulose

By phosphorylation or by aminoethylation, ion-exchange properties are imparted to cotton fabrics. These modified celluloses are then pulped and either converted into paper or used in chromatographic columns for the separation of cations or anions. The aminoethylcellulose, which is the more water-repellent, is more difficult to convert into thin paper than is the phosphorylated material. Because these experiments have shown promise, the work is being continued. N. F. Kember and R. A. Wells. *Nature*, 175, No. 4455, 512-513 (1955); through *Bull. Inst. Paper Chem.*, 25, 705.

Carbonyl groups in cellulose by oximation

The oximation reaction between hydroxylamine hydrochloride and the carbonyl groups of cellulose, or of compounds of lower molecular weight, can be carried out so that it is possible to determine very accurately the total amount of hydrochloric acid liberated in the reaction. This free acid corresponds stoichiometrically to the original carbonyl groups in the sample, and the results are sharply reproducible.

In a carefully prepared, apparently undegraded, cellulose it is possible to detect one carbonyl group in the presence of more than 8,000 glucose units. The procedure, which is described in great detail, thus serves as a quantitative end-groups assay. Olli Ant-Wuorinin and Asko Visapää. *Paperi ja Puu* (*Paper and Timber, Finland*), 37, 231-246 (1955) (in English).

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PATENT REVIEWS

Melvin Nord*

Apparatus for treating paper stock

U.S. 2,703,533, issued March 8, 1955, to Edwin Cowles and assigned to The Cowles Co., describes an apparatus for preparing paper stock which is capable of producing an unusual degree and type of fibrillating action, thereby producing an unusual strength development in the finished sheet in less time and with less power than is ordinarily required.

The operating unit (apart from the container in which it is enclosed) is shown in Fig. 1, and consists of bedplate 1 and a rotor 2 carrying knives 3. The bedplate is in the form of an annular ring having a working surface provided with alternating grooves 4 and bars. The knives are in contact with the bars of the bedplate so that the leading edges cross the bars and grooves at an angle of 10-30°.

The knives are so constructed that during

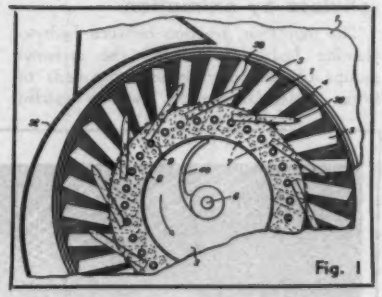
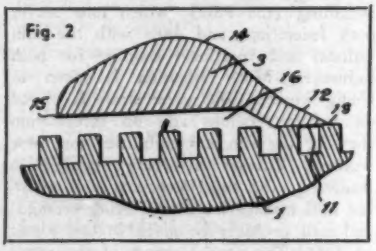


Fig. 1

the operation of the machine the motion of the knives relative to the bedplate produces a hydraulic reaction which holds the knives in yielding contact with the bedplate. Referring to Fig. 2, it will be observed that the under surface of each knife is recessed, leaving only a relatively narrow foot 11 extending along the leading edge and in contact with the bedplate bars. The upper surface 12 of the knife, immediately adjacent the advancing edge 13, intersects the bottom surface of the foot at a relatively small angle, preferably less than forty-five degrees, which has been found to be a favorable angle for causing fibers to be picked up and retained on the advancing edge. The advancing edge of the knife is rather sharp, and if the metal of the surface 12 is hardened, the knife will tend to be self



sharpening in use. The remainder of the upper surface 14 is curved smoothly and intersects the surface to form the trailing edge 15 of the knife.

The patent gives detailed results of tests made with the apparatus.

*Patent attorney, 17600 Pinehurst, Detroit 21

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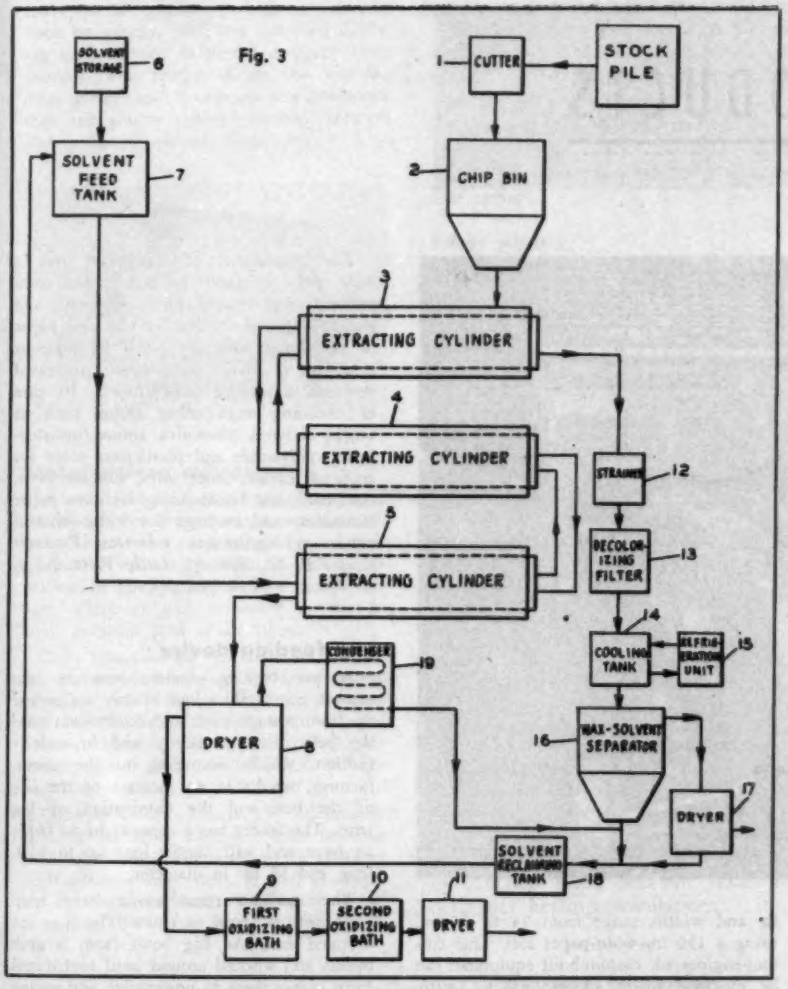
Process of treating waxed paper

U.S. 2,703,754, issued March 8, 1955, to Robert E. Myers, describes a process for recovering wax from waxed paper and leaving the paper in a form available for re-use after deinking.

As shown in Fig 3, the waxed paper from the stock pile passes through a cutting and chopping device 1 to provide paper chips of the desired size and then to the paper chip bin 2. From the bin 2, the paper chips are fed to wax extraction equipment which consists of a series of heated horizontal cylinders 3, 4 and 5, in which the paper chips are subjected to counter-current extraction. Each of the cylinders 3, 4 and 5 is equipped with a helical screw conveyor driven electrically from an extended shaft at one end, and electrically-driven pumps (not shown) carry the paper chips from cylinder 3 to cylinder 4 and from cylinder 4 to cylinder 5. The paper chips enter the right end of cylinder 3, are discharged from the left end of that cylinder into the left end of cylinder 4, are carried through that cylinder and discharged from the right end into the right end of cylinder 5 and are then carried through and are discharged from the left end of cylinder 5. The solvent storage is indicated at 6, and the solvent (e.g. trichlorethylene) flows from this tank to a solvent feed tank 7 from which it is delivered to the left end of cylinder 5 by a pump (not shown).

The paper chips, thoroughly soaked with



solvent, are passed to a drier 8 to vaporize the solvent, the solvent being condensed in condenser 19 and returned to solvent feed tank 7. The paper chips are then ready for re-use in the manufacture of paper. When deinking is required, the paper chips from the solvent drier 8 are passed to the first oxidizing bath (an alkaline solution of a peroxide) shown as tank 9, then to the second oxidizing bath (a solution of a water-soluble hypochlorite) shown as tank 10, and then to drier 11.

The solvent heavily laden with wax removed from cylinder 3 is passed through strainer 12 to remove any solid material and then through decolorizing filtration equipment 13 containing bone char, fuller's earth, or the like to remove any coloring materials. The filtration equipment is heated to maintain the solution of wax in the solvent at the desired temperature. The clarified solution is then cooled or chilled in a tank or in coils 14, to which is connected a refrigeration unit 15, the temperature of the solution being lowered to the point where the solvent will have very little or no solvent power for the wax. As a result of this cooling, the wax will separate from the solution as a sludge, and the resulting slurry is passed to the separation equipment 16 which may be a filter press, but is preferably a centrifuge including a scraping unit for the removal of the separated wax. The wax is discharged into the wax drier 17 to remove the residual solvent which is passed through a condenser (not shown) and is added to the main solvent separated from the wax which is flowed from the separating equipment 16 to reclaiming tank 18. The wax after removal of the residual solvent by drier 17 may be compressed or melted into blocks or cakes ready for re-use in the treatment of paper or for packing or sale for that or other purposes. The solvent recovered is returned from reclaiming tank 18 to solvent feed tank 7 by means of a pump (not shown).

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Paper refiner	The Alexander Fleck Ltd.	2,697,966	12/28/54
Pulp article transfer and reshaping machine	Chaplin Corp.	2,697,967	"
Shipping and service container for nuts and bolts	John E. Hines	2,698,124	"
Partitioned container	National Container Corp.	2,698,125	"
Heavy-duty fiber bottle container	Beisinger Inc.	2,698,126	"
Redwood bark cooking process and insulation board product	The Pacific Lumber Co.	2,698,233	"
Manufacture of water finished board having an insolubilized protein mineral coating on it	The Gardner Board & Carton Co.	2,698,259	"
Pulp forming mold	Keyes Fibre Co.	2,698,557	1/4/55
Multicompartment carton and package	Morton J. Margolies	2,698,708	"
Collapsible container	Elmer A. Neuman	2,698,709	"
Urea-formaldehyde resins for wet-strength paper	American Cyanamid Co.	2,698,787	"
Sized paper consisting of a polymerized alkyleniminе	American Cyanamid Co.	2,698,793	"
Control apparatus for pulp refiners	Minneapolis-Honeywell Regulator Co.	2,699,095	1/11/55
Rectifier roll assembly	Beloit Iron Works	2,699,096	"
Apparatus for forming perforated tea bag paper	Ecusta Paper Corp.	2,699,208	"
Fluid-circulation rectangular platen for presses used in the manufacture of wallboard	Borje V. Hedin	2,699,325	"
Paper coating compositions	The National Cash Register Co.	2,699,432	"
Machine for coating containers	National Paper Bottle Co., Inc.	2,699,750	1/18/55
Labeling device	Nekoosa-Edwards Paper Co.	2,699,881	"

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A new, large multi-wall tuber, capable of producing four-wall flat or gussetted tubes at a top paper speed of 300 fpm, has recently been built. Lengths produced on this multi-wall tuber range from 30 to 102 in. and widths range from 24 to 64 in., using a 130 in. wide paper roll. This custom-engineered, custom-built equipment can be modified to fit specific needs. *Smith-Winchester Manufacturing Co., South Windham, Conn.*

Epoxy resin water emulsion

Epoxy resin water emulsion is compatible with, may be blended with, and may be compounded with almost all resin emulsions or plasticizers to meet the most rigorous requirements, according to the manufacturer. The milk white resin containing 40 per cent epoxy solids, the melting point of which is 67 to 70° C, approx. pH 6.9, is said to be stable and compatible in acid, alkali and salt mediums. The dried film is colorless, odorless, clear, firm, flexible, lustrous, non-tacky and water resistant, it is reported.

The adaptability of this resin over a wide pH, resistance to water, and compatibility with waxes, films, pigments, and glasses suggests its use in felt and paper sizing. Paper saturated with its aqueous solution is said to impart increased strength, flexibility and firmness. Its ease of blending with other resins such as vinyls, styrenes, phenolics, amine formaldehydes, polyamids and plasticizers serve for artificial leather, inner soles, suitcase parts, cardboard and bookbinding sections, paper laminates, and coatings for water-resistant paper and containers. *Chemical Products Corp., P. O. Box 61, Little Falls, N. J.*

Log feeding device

A log feeding device, now on the market, unscrambles logs as they are picked up from storage piles and feeds them onto the belt conveyor gently and in orderly fashion, which, according to the manufacturer, results in an increase of the life of the belt and the elimination of log jams. The feeder has a capacity of 50 cords an hour and will handle logs up to 5 ft. long and 18 in. in diameter.

The machine resembles a huge soup bowl with a spout or chute. The logs are dropped into the big bowl from a grab bucket and whirled around until centrifugal force causes them to unscramble and escape in an orderly manner through the chute. They drop gently on the moving belt one or two at a time and ride to their destination, which usually is the debarking and chipping department.

Mounted on wheels which run on a track, the feeder can be moved back and forth through the storage area and can operate at any point along the track paralleling the conveyor. It may also be used as a transfer device to move logs from one

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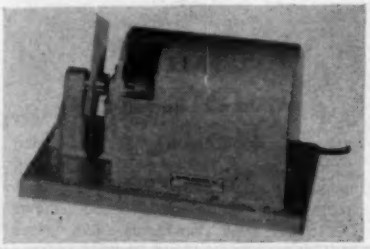
conveyor to another, which is usually done by gravity, with one conveyor climbing high enough to permit dumping onto another. The feeder effects the transfer more gently, and it requires less headroom than the gravity transfer method. *Hewitt-Robins Inc., Stamford, Conn.*



Motor-driven micrometer

A new "gearless" micrometer, known as the Model 555, is now being manufactured. It replaces the conventional gear-type movement with a synchronous motor operating in conjunction with a torque device, which is said to assure a constant anvil pressure load at all times.

The motor-driven micrometer removes the human element as a factor in testing samples. According to the manufacturer, the operator inserts the sample to be tested between the anvils, throws a simple toggle switch and is able to make fast, reliable and easy readings to 1/100,000 in.

Capacity of the Model 555 micrometer is 1/16 in. It is equipped with stainless steel anvils, dead flat, and can be obtained with different anvil sizes, as well as different anvil pressure loads. *Testing Machines, Inc., 123 W. 64th St., New York 23, N. Y.*

Starch, gum & resin products

An improved line of paper mill starch products, water-soluble gum and resin products has been announced. Several new grades of Mannogal and Star gums, Mannangalactan products, have been developed to give improved performance and economies in papermaking, especially with reference to better bonding between fibers and improvement in mullen.

For tub sizing and calender finishing operations, several items for surface treatment have been introduced, including Porosize, a film-forming product for improving printability of container boards for sharper reproduction. *Morningstar, Nicol, Inc., 630 West 51st St., New York 19, N. Y.*

New Products

(Continued from page 545)

creased folding endurance (about 200 times that of paper made from wood pulp and rags).

Cleaning wipers

Wipers made of soft but tough one-ply sanitary disposable sheet, for use in cleaning machinery, wiping glass, and polishing high-gloss surfaces, have been developed by Brown Co., Berlin, N. H. These wipers, known as the NIBROC wipers, measure 10¾ by 16 in.

Also developed by Brown is a lighter shade kraft envelope paper with the view to imparting greater eye appeal.

Fiber piping

In the field of fiber piping, Brown has developed combination-size fittings which permit the connection of varying size pipe branches to the main line.

Paper mills view the textile market

St. Regis has been conducting experiments with the view to applying papermaking principles to the production of fabrics from orlon, dacron and nylon, which would be competitive with the textiles made from silk, wool, and cotton.

Spirally wound paper tubes

The spirally wound paper tube is a relatively new and exceedingly fast-growing product. It is manufactured from chipboard made from waste newsprint and corrugated boxes. The increasing demand for these tubes stems from their use in the construction field where they serve as circular concrete column forms, voids in concrete slabs, and air ducts in perimeter heating installations.

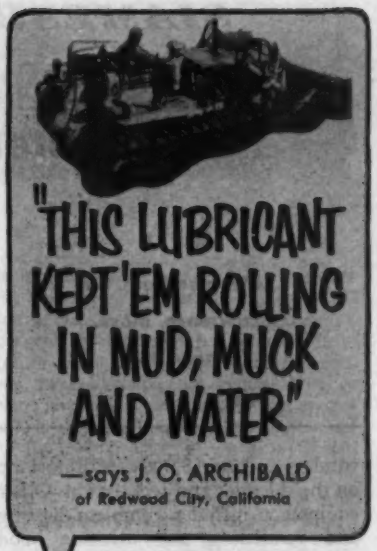
Industry Expansion

(Continued from page 565)

St. Croix Paper Co.
directors have voted to recommend to the stockholders an expansion program at the Woodland, Maine plant that will cost an estimated $13,000,000. It is expected that the new facilities will be in full operation by 1958. Included: high-speed newsprint machine, expansion of the groundwood mill, an increase in steam plant capacity, and conversion of the electrical system from 25 to 60 cycle.

St. Helens Pulp & Paper Co.
has placed the "world's largest" Yankee-type tissue machine in operation at St. Helens, Ore. Start-up of the 90-ton Beloit unit highlights a $14,000,000 modernization program that began in 1953. The machine has a 258-in. wire and is equipped with a 12-ft. diameter Yankee dryer. It is designed for speeds of up to 3000 fpm.

A modern dust collection system has been provided, consisting of a 25,000-cfm Rotoclone on each of two



The job was clearing 500 acres of salt marsh for crystallizing ponds. To quote, "We selected LUBRIPLATE No. 107 for track and general lubrication and LUBRIPLATE APG-140 for transmissions and final drives. During the entire job there was no replacements of track rollers nor any tie-ups of equipment due to parts replacement or breakage!"

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winders and an 18,000-cfm Rotoclone on the calender and reel section. Other equipment includes complete heating and ventilating and machine hood exhaust equipment; jordans; centricleaners; machine room bridge crane; roll grinder; doctor blade grinder; air compressor; vacuum pumps, and saveall.

St. Regis Paper Co.
has completed a $2,300,000 expansion project at Pensacola, Fla. Included in the pulp and paper mill construction were a new boiler and turbine in the power plant, erection of one of the country's largest high density storage systems, and the installation of a new washer system.

The firm is also installing kraft paper and board machines at Jacksonville, Fla., and Tacoma, Wash., at a total expenditure of some $40,000,000; and has recently placed in operation a multi-wall bag manufacturing plant at Franklin, Va.

Scott Paper Co.
of Chester, Pa.—in order to increase productive capacity—will equal or exceed in 1955 the $36,000,000 spent by Scott, Hollingsworth & Whitney and Detroit Sulphite for capital additions and improvements during 1954.

As part of this over-all expenditure, the firm will expand its pulp and papermaking and converting equipment in Mobile, Ala. The project will cost several million dollars. Included in the expansion will be additional digester capacity, new recovery boiler equipment, wood preparation and water treatment facilities, a high-speed paper machine, and roll tissue and towel converting facilities.

At the Detroit Div. it is expected that the new high-speed paper machine will be in production in October. Unit is part of a $6,000,000 expansion program at the plant. It is possible that $20,000,000 will be spent here over the next five years.

Scott will devote $6,000,000 to improvements at the H & W Div. in Winslow, Maine. Included in the project will be a new paper machine and stock preparation equipment.

The firm recently completed another phase of its expansion at Everett, Wash., when No. 4 paper machine went into production, together with a quantity of supporting equipment and pulp preparation facilities.

Southern Advance Bag & Paper Co.,
a subsidiary of Robert Gair Inc., is engineering an $11,000,000 improvement program. It will include the installation of a 246-in. bag paper machine, plus the conversion of a 242-in. machine from bag paper to semichemical corrugating material.

Union Bag & Paper Corp.
will spend approximately $18,000,000 in a five- to six-year modernization program at Savannah, Ga. The project will see the replacement of heavy equipmet that has been in service for 15 to 20 years.

United States Gypsum Co.
has awarded contracts to Black-Clawson to supply all major board-making equipment to be installed in USG's new Houston, Texas mill. Included will be a B-C eight-cylinder board unit and Shartle stock preparation equipment.

The firm also plans to build a multimillion dollar wallboard plant on a 50-acre tract at Stony Point, N.Y.

Valentine Pulp & Paper Co.,
the only plant in the United States using whole sugar cane bagasse for paper manufacture, is expanding its Lockport, La. plant from 50 to 75 daily tons.

Watervliet Paper Co.
is increasing its output of wood pulp at Watervliet, Mich., with the installation of two 16-ft. diameter Globe rotary digesters; is also embarked on a $1,200,000 expansion of the experimental pulp plant.

Western Kraft Corp.
a newly formed company, will build a multi-million dollar kraft board mill near Albany, Ore. Capacity of the proposed plant will be a daily 100 tons of kraft containerboard. Designed especially to utilize wood waste, the proposed mill was scheduled for completion in December 1955.

West Virginia Pulp & Paper Co.
has announced a $100,000,000 expansion and modernization program. Included are the installations of two new machines (one at Charleston, S. C., and one at Luke, Md.) and the construction of a pulp and paper mill, probably at Tyrone, Pa.

Weyerhaeuser Timber Co.
will spend more than $20,000,000 in the construction of a 400-ton sulfite mill at Cosmopolis, Wash. Completion is scheduled for 1957.

And at Longview, Wash., the firm plans the addition of a 165-in. Beloit kraft paper machine. Weyerhaeuser is also installing additional facilities at the pulp mill to supply the newly-established R-W Paper Co. with raw material. Included are new chip storage tanks, digesters, screening and bleaching units, a boiler house and filter plant.

Whiting Paper Co.
of Holyoke, Mass., will install a new J. H. Horne & Sons Co. paper machine in a major new equipment investment.

Willamette Valley Lumber Co.,
one of Oregon's largest lumber firms, plans a $10,000,000 pulp and paper mill at Corvallis, Dallas or Foster.

NEW LITERATURE

Books

WORLD FOREST RESOURCES. Published by the Food and Agriculture Organization of the United Nations, Rome, Italy. Distributed by International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y. 8½ x 11. 120 pages. Paperbound. $2.50.

This book contains the results of a forest inventory of countries taken in 1953. Compared with the first inquiry, this inventory records considerable progress in the scope and reliability of the figures reported.

The data in this publication are based on responses to the 1953 questionnaire, together with the results of the first inventory, supplemented by data collected with the aid of authorities in member countries, official reports, and FAO Technical Assistance field experts. Information is grouped acording to the following classifications: forest area in relation to other land categories; accessible forests: yield and ownership; forests in use: management, standing timber, growth, fellings and removals; other roundwood sources, and changes in forest resources.

Appendices include definitions of terms used, country notes, and conversion factors. This book is written in three languages: English, French and Spanish.

MANUFACTURE & APPLICATION OF LUBRICATING GREASES. By C. J. Boner. Published by Reinhold Publishing Corp., 430 Park Ave., New York, N. Y. $18.50.

The reasons for this book are well set forth in the preface as follows:

Nearly a score of years has passed since the publication of a comprehensive book on lubricating greases. In the meantime, great improvement has been made in such products, and a large proportion of the lubricating greases now manufactured consist of types not perfected a few years ago. Improvement in processing and equipment has kept pace with or preceded that of the finished product. Likewise, the theory of structure and application of lubricating greases has received considerable attention within the past ten years.

The author is well qualified by background, experience and reputation to discuss the field.

This book is a much needed reference source in a field which has long been lacking such a standard work. It should be useful to mechanical engineers in all types of industry which have lubrication problems. The author has very carefully checked other authorities in the field, and the reader is referred to the preface.

The book contains a complete table of contents, which goes far beyond the usual form. It is thus helpful in deciding which parts to read.

The 23 chapters are as follows: Introduction; Structure and Theory; Additives Other Than Structure Modifiers; Raw Materials; Manufacturing Processes; Equipment For Lubricating Grease Manufacture; Aluminum Base Lubricating Greases; Barium Base Lubricating Greases; Calcium Base Lubricating Greases; Lithium Base Lubricating Greases; Sodium Base Lubricating Greases; Lead Soap Lubricating Greases; Strontium Base Lubricating Greases; Miscellaneous Metal Soaps as Components of Lubricating Greases; Mixed Base Lubricating Greases; Complex Soap Lubricating Greases; Non-Soap Thickeners for Lubricating Fluids; Fillers in Lubricating Greases and Solid Lubricants; Residual and Petrolatums as Lubricants; Analysis of Lubricating Greases; Tests of Lubricating Greases and Their Significance; Application of Lubricating Greases, and Trends in Lubricating Greases.

This work has an excellent coverage of the lubricating grease field. It should fill a real need in compounding, manufacturing and in the application of lubricating greases. It should be extremely helpful to lubrication engineers in the pulp and paper industry. It should assist in better understanding of lubricating greases and in their proper use and application.

John B. Calkin

Booklets and Pamphlets

THE STATUS OF DEMINERALIZING IN TODAY'S PLANTS (Technical Reprint T-127). By V. J. Calise. Reprinted by Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y. 8½ x 11. 6 pages. This reprint from *Combustion* magazine presents a comprehensive discussion on the subject of demineralization for boiler feedwater and supplies helpful curves for estimating costs and performances of the systems now available. There are flow diagrams of the basic types of units, and the results that can be ob-

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tained from each are given. Drawings of typical regeneration systems, cutaway view of an ion exchange unit and a table of suitable piping and fitting materials are also presented. Another feature is the chart on estimated chemical operating costs for various demineralizing systems.

PINE SAWMILLING COSTS BY LOG SIZE—AN ESTIMATING METHOD (Station Paper No. 43). By Walter C. Anderson. Published by Southeastern Forest Experiment Station, Asheville, N. C. 8 x 10½. 16 pages. A simple method for estimating the cost of sawing mill-run pine lumber from logs of any size at small sawmills is described in this paper. This estimating method is based upon time-study data obtained during an investigation of the marketing of sawmill and logging residues.

PULPWOOD LANDINGS. By R. D. Collier and C. R. Silversides. Published by Pulp and Paper Research Institute of Canada. (Order from McGill University Book Store, 3480 University St., Montreal, P. Q., Canada.) 8½ x 11. 67 pages. $1.50. The objective of this survey is to inform the reader of the many problems involved in locating, planning, constructing and operating pulpwood landings. A general discussion of pulpwood landings is presented first. The booklet then goes on to discuss primary, secondary and intermediate landings; lake and river ice, lake and river bank and dry chute landings. Besides the information section dealing with ice engineering, the most valuable contribution

New Literature . . .

this booklet makes is its bibliography of little known sources pertaining to the important role that landings play in pulpwood transportation.

ANNUAL REPORT FOR 1954 (Station Paper No. 50). Published by Southeastern Forest Experiment Station, Asheville, N. C. 8 x 10½. 96 pages. This annual report covers the following topics: forest management, naval stores, forest economics, watershed management, forest fire research, forest utilization service, range management, forest disease research, and forest insect research. Numerous photographs, tables and graphs are included. Publications by members of the staff of the Southeastern Forest Experimentation Station, including cooperators, are listed.

GRINDING PRETREATED HARDWOODS: EXPERIMENTS ON QUAKING ASPEN, SWEETGUM, RED ALDER, BLACK TUPELO, SUGAR MAPLE, RED OAK, AND COTTONWOOD (Report No. 2015). By Axel Hyttinen and E. R. Schafer. Published by U. S. Forest Products Laboratory, Madison 5, Wis. 8 x 10. 20 pages. This report describes some experiments on pretreating quaking aspen, sweetgum, red alder, black tupelo, sugar maple, red oak, and cottonwood. The results of these studies, which include both mild and severe treatments with neutral sulfite solutions, are presented. Observations are made on the different woods regarding the effects of the treatments on their grinding characteristics, their pulp properties, and their use in several kinds of paper.

ANNUAL REPORT FOR 1954. Published by Lake States Forest Experiment Station, St. Paul Campus, University of Minnesota, St. Paul 1, Minn. 8 x 10½. 58 pages. This 31st annual report discusses in some detail the research program of the Lake States Forest Experiment Station, in addition to some of the major projects now being carried on, and plans of the station for next year. A list of publications issued by the station during 1954 is also included.

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Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Mill & Kiln Gears. Falk Corp., Dept. 255, 3001 W. Canal St., Milwaukee 8, Wis.—Engineering Report 6170, containing 23 pages and illustrated with drawings and photographs, compares the design and operating characteristics of the various types of ring gears which have been employed to drive kilns and mills and indicates the performance which may be expected.

Waste Treatment. Chain Belt Co., Dept. PR, Milwaukee 1, Wis.—The Rex Float-Treat, a new mechanical process used to separate greases, chemical flocs, and suspended organic matter from industrial waste liquids, is described in Bulletin 54-82.

Industrial Waste Treatment Equipment. Graver Water Conditioning Co., Dept. PI, 216 W. 14th St., New York, N. Y.—The basic types of industrial and municipal waste treatment equipment are discussed in 4-page Bulletin WC-117, along with photographs of typical installations. The advantages of industrial waste treatment are presented.

Manlift Elevators. Humphrey Elevator Co., Inc., Dept. PI, Faribault, Minn.—A new pocket size folder, designated as No. HF-55, illustrates and describes the four standard models of Humphrey manlift elevators. In addition to application photographs, this literature includes product data, user benefits, and information on safety features required to comply with varying state codes and laws.

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Paper and Paperboard Making	6.00
Principles of Management	6.00
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Outside U.S.A.	2.50
Drying of Paper on the Machine	1.50
Lessons in Papermaking—Part 1	1.50
Lessons in Papermaking—Part 2	1.50
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Trouble on the Paper Machine	.75
Pulp Bleaching (A Symposium)	.50
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RAGS (Domestic)

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No. 1 White Shirt Cuttings	15.00 to 15.50
New Unbleached Muslins	16.50 to 17.00
Fancy Shirt Cuttings	7.00 to 7.50
No. 1 Percales	7.00 to 7.50
No. 1 Washables	3.00 to 3.25
No. 1 Light Silesias	7.75 to 8.25
No. 1 Light Prints	5.75 to 6.00
Light Flannelettes	7.75 to 6.25
Cottonades	3.75 to 4.00
Blue Overalls	8.00 to 8.50
Blue Cheviots	8.00 to 8.50
Canton Flannels, Bleached	11.50 to 12.00
Canton Flannels, Unbleached	11.50 to 12.00
Osnaburg Cuttings	10.00 to 11.00
Underwear Cuttings, Bleached	16.00 to 16.50
Underwear Cuttings, Unbleached	16.00 to 16.50
Khaki Cuttings—	
Sun Tan	6.50 to 6.75
Mixed	3.75 to 4.00
Linen Cuttings—	
American	7.50 to 8.00
White	12.00 to 13.00
Grey	12.00 to 13.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

Roding	Per cwt.
No. 1	1.75 to 1.85
No. 2	1.40 to 1.50
No. 3 and 4	1.10 to 1.20
Twos and Blues— Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.15 to 2.40
Miscellaneous	1.85 to 2.00
Whites, No. 1—	
Repacked	4.00 to 4.25
Miscellaneous	3.25 to 3.50
White, No. 2—	
Repacked	3.00 to 3.25
Miscellaneous	2.50 to 2.75

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shoppers	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.50 to 6.00
Domestic	5.50 to 6.00
Wool Tares—	
Light	5.50 to 6.00
Heavy	5.75 to 6.25
No. 1 Scrap Bagging	4.50 to 5.00
Manila Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.00 to 5.25
Sisal Rope—	
No. 1 large	4.75 to 5.00
No. 1 small	4.25 to 4.50
New Burlap Cuttings	5.75 to 6.25
Jute Threads—	
Foreign (Nom.)	6.00 to 6.25
Domestic	6.25 to 6.50
Strings—	
No. 1 sisal	4.75 to 5.00
No. 2 sisal	4.25 to 4.50
Soft jute	4.75 to 5.00
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts	125.00 to 135.00
Hard White No. 1	100.00 to 105.00
Soft White, one-cut	75.00 to 80.00
Soft White, No. 1	60.00 to 65.00
Coated Soft	40.00 to 45.00
Fly Leaf No. 1	35.00 to 40.00
Fly Leaf, Woody No. 1	35.00 to 40.00
No. 2 Mixed Col. Woody	30.00 to 35.00
Flat Stock— No. 1 Heavy Books and Magazines, Repacked	24.00 to 26.00
Mixed Books	19.00 to 20.00
Ledger Stock—	
No. 1 White	60.00 to 65.00
No. 1 Mixed (Colored)	40.00 to 45.00
Manilas—	
New Env. Cuttings	70.00 to 75.00
New Cuts, One-Cut— Extra Manilas	22.00 to 24.00
Manila Tab Cards, Free of Ground Wood	85.00 to 95.00
Colored Tab Cards	60.00 to 65.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	40.00 to 45.00
No. 1 Old Assorted	30.00 to 35.00
News—	
White Blank	70.00 to 75.00
Overissue	26.00—
No. 1 Folded	22.00—
Old Corrugated Containers	32.00—
New Jute Corrugated Cuts	35.00—
Mill Wrappers	22.00—
Box Board Chips	14.00—
No. 1 Mixed Paper	14.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	5.05—
Ground, cwt.	4.30—
Powdered, cwt.	5.10—
Blanc Fixe—	
Pulp, bulk, ton	100.00—
Dry, barrels	105.00—
Bleaching Powder— Drums, cwt	5.00 to 6.00
Casein (Domestic Standard) 20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	27.00 to 29.00
Argentine, lb.	24.00 to 24.50
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 13.00
Domestic Coating Bulk (mine) ton	17.00 to 25.00
Imported (ship side) Bulk (lump) ton	30.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.93—
Gelatine (silicon), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.29½ to .30
Litharge, powd. bbl. lb.	.16½ to .17

MARKET QUOTATIONS

Rosin (Gum)— New York, per 100 lbs.
E ..... 9.55—
F ..... 9.55—
G ..... 9.55—
WW ..... 9.70—

Rosin (Wood), carlots, F.O.B. South .... 6.00—

Salt Cake—
Dom. bulk (wks) ton 28.00 to 29.00
Imp. bulks on dock— (Atl. ports) ton (Nom.) ..... 22.00—

Soda Ash—
Bulk (works) cwt... 1.35—
Paper bags, cwt..... 1.65—

Soda (Caustic)—
Solid drums, cwt.... 3.85 to 4.50
Ground and flake, drums, cwt..... 4.25 to 5.00

Sodium Silicate—
60 deg. 55 gal. drums, (works) cwt..... 1.60 to 1.70
40 deg. 55 gal. drums, (works), cwt..... 1.35 to 1.40

Starch—
Pearl, 140 lb. bags, cwt. ..... 7.14—
Pearl, barrels, cwt. .. 7.14—
Paper (Sq.) bags, cwt. 7.14—
Powdered, barrels, cwt. 7.35—

Sulphur (Crude)
(Mine) bulk, long ton 26.50 to 28.00

Talc—
Dom. 100 lb. bags (mine) ton ..... 25.00 to 28.00
Canadian ..... 35.00 to 45.00

Titanium Dioxide—
Barium Pig. bbls., lb. .22½ to .23
Calcium Pig. bbls., lb. ..... .32½ to .33

Zinc Oxide, bags ..... 14.00 to 15.50

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follows:

Bleached Sulphite ....145.00—
Bleached Sulphite, Canadian .....145.00—
Unbleached Sulphite ...120.00—
Unbleached Sulphite, Canadian .....125.00—
Bleached Soda .....142.00 to 142.50
Bleached Soda, Canadian.142.00 to 142.50
Kraft Bleached .....147.00 to 150.00
Kraft, Bleach., Hardwood .....145.00—
Kraft, Bleach., Southern.150.00—
Kraft, Bleach., Canadian.150.00—
Kraft, Unbleached, Northern .....132.50—
Kraft, Unbleached, Southern .....115.00—
Kraft, Unbleached, Canadian .....110.00 to 115.00
Kraft, Semi-Bleached, Southern .....130.00 to 135.00
Sulphite Screenings .... 72.50—
Sulphate Screenings .... 67.50—
Groundwood ..... 75.00 to 85.00

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish .....142.50—
Bleached Sulphite, Norwegian, freight allowed.142.50—
Bleached Sulphite, Finnish, freight allowed..145.00—
Unbleached Sulphite, Swedish .....125.00—
Unbleached Sulphite, Finnish freight allowed..125.00—
Kraft, Unbleached, Swedish, freight allowed..110.00 to 115.00
Kraft, Unbleached, Finnish, freight allow.110.00 to 140.00
Kraft, Bleached, Swedish, on dock....147.50—
Kraft, Bleached, Norwegian .....147.50—

PAPER

Quotations are mill quotations New York City

Boards—

Prices per ton, delivered in New York, 10 tons or more:

Plain chip ..... 85.00—
News vat lined chip ... 90.00—
.009 chip, rolls ..... 90.00—
Filled news ..... 85.00—
Solid news ..... 90.00—
White vat lined chip. .125.00—
Chip tube and can stock.100.00—
Single manila lined chip.140.00—
Single jute lined chip..125.00—
Kraft liner .....125.00 to 132.50

White patent coated:
.020 .....155.00—
.018 .....157.50—
.016 .....160.00—

Book Paper f.o.b. New York— per cwt.

Machine coated, two sides
70 lb. No. 2 enamel; 25x 4 cases $17.25
38-500, trimmed 4 sides. Carloads $16.30
45 lb. enamel, 25x38-500, 4 cases $13.05
trimmed 4 sides..... Carloads $12.10

Uncoated
55 lb. No. 2 offset, 25x38 4 cases $14.80
500, trimmed 4 sides.... Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, un 4 cases $14.05
trimmed ..... Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed ..... Carloads $12.40
16 lb. tablet, 17x22-500 ..... Carloads $11.35

Rag Content Bond—
(White, 5,000 to 10,000 lbs., basis 16 lb.)
100% rag..... 58.80—
75% rag..... 45.45—
50% rag..... 36.20—
25% rag..... 29.70—

Rag Content Ledger—
(White, 5,000 to 10,000 lbs.)
100% rag..... 58.80—
75% rag..... 45.45—
50% rag..... 36.20—
25% rag..... 29.70—

Sulphite Bond—
(White, 5,000 to 10,000 lbs., basis 16 lb.)
No. 1..... 20.10—
No. 2..... 20.40—
No. 4..... 17.75—

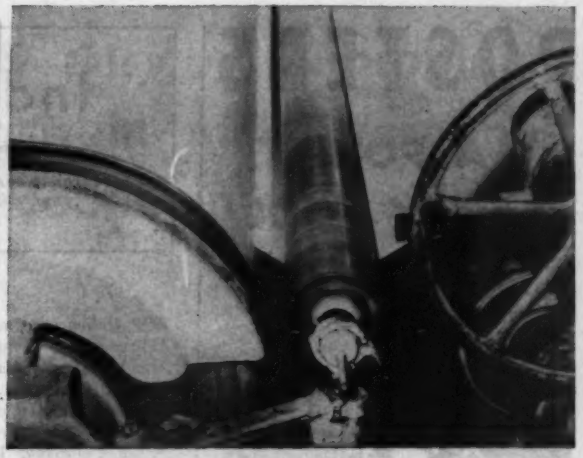
Sulphite Ledger—
(White, 5,000 to 10,000 lbs.)
No. 1..... 20.50—
No. 2..... 19.75—
No. 4..... 18.15—

News delivered in New York— per ton
Rolls, Standard (Contract) .....125.00 to 126.00
Rolls (Spot) ..... (Nominal)
Sheets .....138.00—

Tissues (Carlots) f.o.b. New York— per ream
White No. 1..... 1.75—
White No. 2 ..... 1.35—
Bleached Anti-Tarnish.. 2.20—
Colored ..... 2.00—
Anti-Tarnish Kraft .. 1.65—
Manila ..... 2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per ct. ..... 1.00—
Napkins, full crepe and embossed (12½ lb. to M shts.) per ct. .. 1.00—
Toilet, Bleached (M shts.) per ct..... 9.35—
Toilet, Unbleached (M shts.) per ct. .. 7.90—

Towels f.o.b. New York— per case
Bleached ..... 6.80—
Unbleached ..... 5.90—

Wrappings (Kraft) f.o.b. New York— (Basis 50 lb. & heavier) per cwt.
Standard wrapping .... 8.25—
Butchers, counter rolls.. 8.50—
Standard bag, mill rolls. 7.75—
Shipping sack, mill rolls. 8.00—
Gumming, mill rolls.... 8.25—
Asphalting, mill rolls...8.00—
Envelope, mill rolls.... 9.50—



How Press Rolls Scraped Themselves Clean!

The grooves in the steel rolls of one mill's soda pulp machine were solidly filled with tenacious deposits of pitch gum and stock. This gummy mess completely blocked the paths that channeled excess water into the pits.

The Oakite Man was asked to demonstrate some easy way to banish this choking build-up. Using an Oakite Steam-Detergent Gun, he proceeded to spray down the rolls with a mixture of Oakite Composition No. 7 and kerosene. Rolls were kept wet for 30 minutes.

Then, while the rolls were still revolving slowly, the Oakite Man engaged the roll doctors. Several turns really piled up the dirt. The rolls were rinsed, and the operation was repeated. This time, the rolls scraped themselves 100% clean!—Another excellent example of why it pays to consult Oakite for every cleaning problem.

Want a complete digest of simplified cleaning techniques especially designed for the paper industry? Your Oakite Man has just such a manual that's yours for the asking. Call him today, or if you prefer, write Oakite Products, Inc., 48A Rector Street, New York 6, N. Y.

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The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

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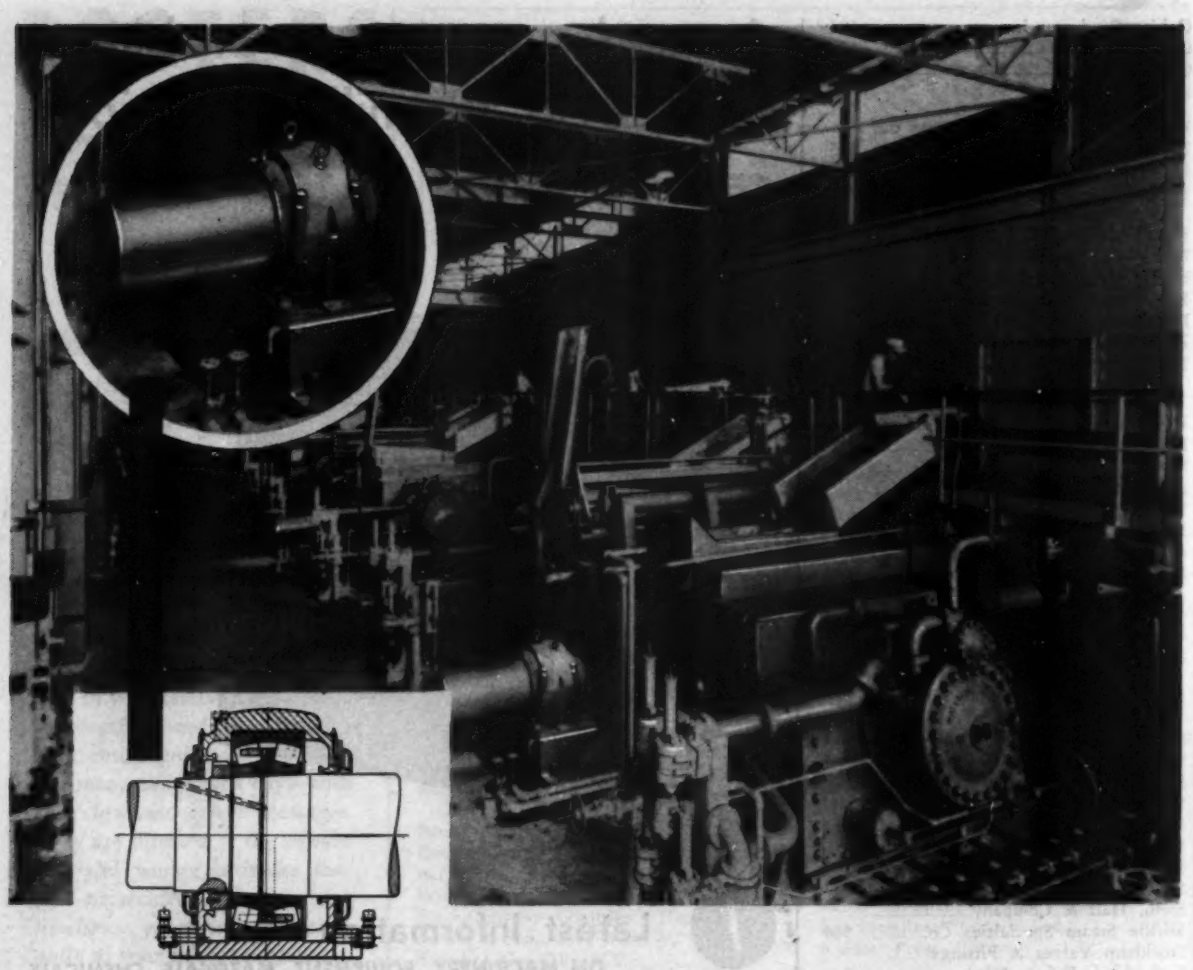

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—at huge, new Bowaters Southern Paper Corp. Mill—Calhoun, Tenn.

The grindermen above are feeding barked logs into the chutes that feed eight Great Northern Waterous 5′ high-production grinders. Logs are pressed hydraulically against revolving high-speed grindstones, which are cooled by jets of water that help reduce the logs to pulp. A single grinder produces 50 tons of pulp per day.

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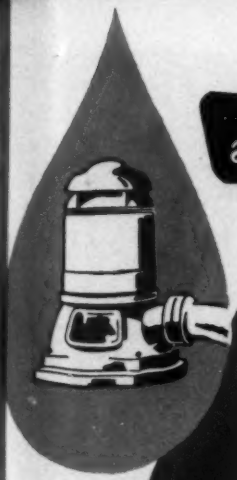

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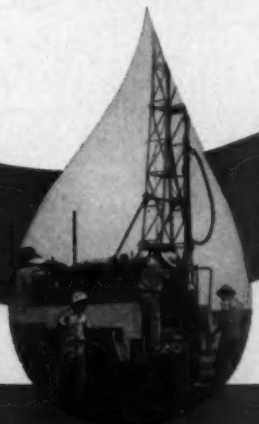

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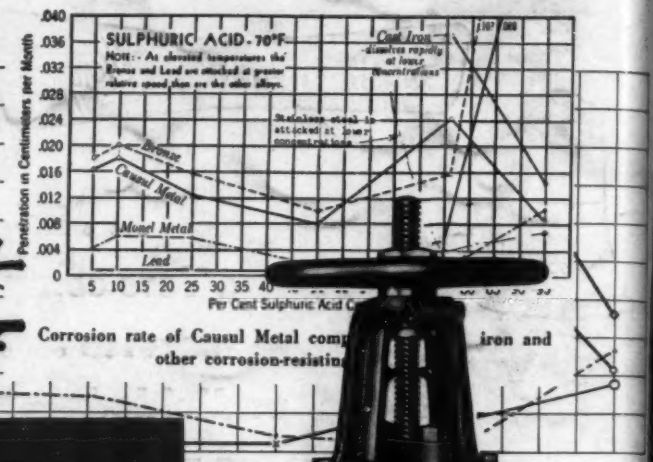

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"Causul" Metal bodies and bonnets are far less expensive than the high alloys — but offer much better resistance to corrosion than cast iron or bronze. Trim is available in Type 316 Stainless Steel or Monel Metal, providing the best corrosion-resistance obtainable in the seats, discs, and stems. With this combination, you get excellent service at minimum cost . . . corrosion-resistant valve service that saves you money.

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"Causul" Metal Valves are now made in a complete size range — ½ to 2 inch, screwed ends . . . 1 to 8 inch, flanged ends — with both Monel and Stainless Steel trims.

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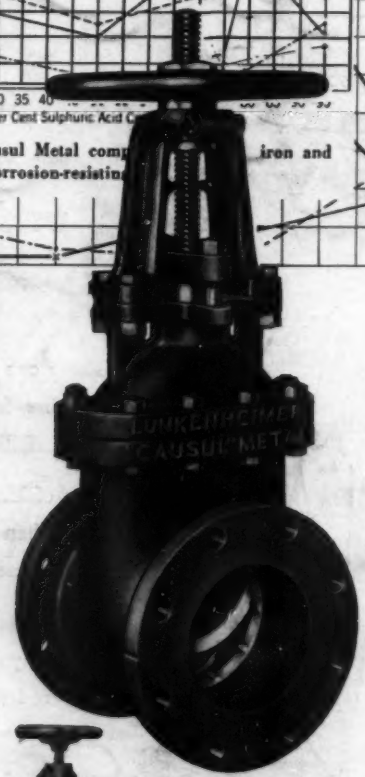
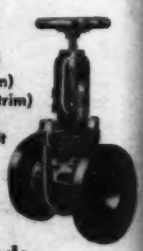


Screwed Ends
Fig. 2008-B (Monel trim)
Fig. 2008-4 (Stainless trim)
½ to 2 inches



Flanged Ends
Fig. 2009-B (Monel trim)
Fig. 2009-4 (Stainless trim)
1 to 1½ inches
2 to 3 inches—Two-Bolt Bonnet Design

Flanged Ends
Fig. 2009-B (Monel trim)
Fig. 2009-4 (Stainless trim)
4 to 8 inches

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